



NLM 00139709 0

SURGEON GENERAL'S OFFICE

LIBRARY.

ANNEX

Section,

No. 163939.

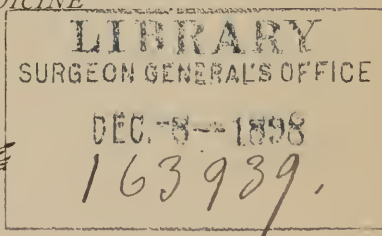
THE
PRINCIPLES OF MEDICINE

AS APPLIED TO
DYNAMICAL THERAPEUTICS

BY
HERBERT T. WEBSTER, M. D.

PROFESSOR OF THE PRINCIPLES OF MEDICINE AND PATHOLOGY; FORMERLY PROFESSOR OF THE THEORY AND PRACTICE OF MEDICINE IN THE CALIFORNIA MEDICAL COLLEGE, ETC., ETC.

*DESIGNED AS AN INTRODUCTION TO THE STUDY
OF ECLECTIC MEDICINE*



PUBLISHED BY THE AUTHOR
AT 855 BROADWAY, OAKLAND, CALIFORNIA

1891

W B J

W 379 p

1891

File # 3671, no. 4

COPYRIGHTED, 1891,
BY HERBERT T. WEBSTER.

TO THE MEMORY OF A KIND FATHER,

JAMES HERVEY WEBSTER,

WHO FILLED A WAYWARD SON WITH AN EARLY AMBITION

TO BECOME A SUCCESSFUL PHYSICIAN, AND CONTRIB-

UTED SUBSTANTIAL AID IN STUDENT DAYS,

THIS VOLUME IS AFFECTIONATELY IN-

SCRIBED BY THE AUTHOR.

PREFACE.

Nearly two years ago I began the preparation of a work which I designated as "Dynamical Therapeutics", and for which the present little volume was intended as an introductory declaration of principles. This portion however was hardly completed before I found myself in indifferent health,—partly the result of overwork, and partly a sequel to that fashionable disease of '90, La Grippe, and decided to spend the following summer abroad, that the benefits of rest and change might be had.

Upon a perusal of the pages of the unfinished work on my return, it seemed to me that the introductory portion, though incomplete in fullness of detail, in many particulars, really constituted the most rational principles of Eclectic Medicine that I had ever seen, and as the pages of this portion were stereotyped, and there must still remain twelve months or more before the department devoted to specific therapeutics could be completed, I decided to publish them in a separate volume; for the importance of a text-book of this kind for our college had long urged itself upon me.

The work as here offered must therefore necessarily be liable to considerable criticism. If it had been written for the purpose of separate publication, many details which have apparently been neglected would have been supplied, but which now have been relegated to the second part. But it is nevertheless believed that the subject has been sufficiently canvassed to war-

rant the presentation of these pages in a separate volume, as a work containing a rational scheme both for the study and application, of modern medicine.

While not intended as a treatise on therapeutics proper, but rather as an introduction to the study of that department, many therapeutic hints have necessarily crept in, as illustrations, which must make it still more acceptable. To facilitate ready reference to these, pains have been taken to render the index tolerably full; the author believing that the practitioner will thus find in it a source of satisfaction outside the mere theoretical aspect of the work. However, a companion volume will be published in time, which will cover the *materia medica*, fully corresponding to the scheme here presented.

As a literary production the work is surely faulty—the author does not need be told this. It is the result of erratic efforts made in moments snatched from a busy professional life, during which time a large practice was encroached upon by the responsibilities of the editorial management of the *California Medical Journal*, and the filling of one of the most important chairs in a college curriculum—Theory and Practice. Frequent repetition will be found—though as what has been written here has been for instruction and not for entertainment or display, this may be fairly considered a good fault.

Grammatical and typographical errors may be encountered. A number have been corrected in the plates but it is painfully evident that others remain. Should the profession, however, accord the work a liberal patronage, an effort will be made to improve upon this issue in later editions.

H. T. W.

PRINCIPLES OF MEDICINE.

INTRODUCTION.

Elementary forms of life consist of single cells, each made up of a mass of protoplasm, usually containing a nucleus. Simple as the structure is, these lowly organisms possess the power of selecting material for nourishment from the surrounding medium, of appropriating it to their needs, and of reproduction, while many of them are capable of active motion. In other words, simple cells are capable of exhibiting independent nutritive, formative, and other functional activities.

Higher forms are also cellular. All living bodies are made up of cells and cell derivatives, but the more complex organization demands a community of cells with reciprocal relationship, so arranged and endowed as to operate in unison, while each one carries out its special part in the general organization; but throughout this arrangement, certain elementary properties persist, though somewhat modified by the controlling influence of elements and functions absent in the simpler forms. In the mammalia, of which man constitutes the head, as well as in many lower forms, cell function is evidently more or less governed by the influence of the nervous and circulatory systems, but notwithstanding this the endowments peculiar to independent cells still prevail, each one

possessing the faculties of selection and appropriation, independently of the others.

It is upon these properties that the therapist largely relies for success in the administration of remedies for the cure of disease. If cells did not possess a selective property and remedies could not be made to influence special portions of the body, the scope of therapeutics would be very much narrowed. "Specific Medication" would hardly have been written, homeopathy would have had but a feeble following, and the medicine of the past would have made but little progress.

Physiology teaches the selective properties of certain cells in the most emphatic terms. The lacteal secretion, the saliva, the gastric juice, the pancreatic fluid, the bile, the succus entericus—all the secretions as well as some of the excretions, are separated from the blood by the action of cells, the selective faculty of each endowing it for its special function.

Going further we find that the cells of every structure possess a physiological endowment distinguishing them by peculiar selective properties. The red blood corpuscles contain the salts of potassium in excess, while the plasma in which they float contains an excess of sodium. The cells of osseous tissue contain a preponderance of calcium phosphate, due largely without doubt to their capacity of imbibing the salt from the circulating medium. In short, every tissue is distinctive on account of its selective properties, though formative force carries out processes which make the distinction more marked.

Of the selective attraction of the structures of the human body for specific drugs, there are also numerous well proven examples which no one will deny. Digitalis possesses an established reputation for its influence upon the heart—a specific or selective influence. In other words, an affinity exists between the sphere of the cardiac

functions and this drug which is infallible in its manifestations if a preparation representing the qualities of the recent plant be employed. The reputation of cantharis as to its affinity for the genito-urinary system is too well known to require more than mention. There is undoubted affinity between the specific emetics and the nervous centers governing the peristaltic action of the stomach, between cathartics and the intestinal canal, between diaphoretics and the sudiparous glands, or their controlling centers, between the salivary glands and sialagogues, and so on throughout the gamut of old classification.

But we go further and assert that every organ and tissue of the body possesses drug affinities. It might be difficult to make this assertion good by furnishing the proof in all cases with present means of knowledge; indeed the subject is yet in an embryo state, though numerous the instances which suggest it. Vital processes are often so complicated that it is impossible to know whether a drug influences the tissues of a part or a nervous center exercising control over it. Physiology must make further discovery before these problems can be explained; though we already possess enough clinical knowledge to enable us to make valuable use of the suggestions in this direction, and the line of study, if carried out must materially assist in making the practice of medicine more pleasant and positive.

When we are able to prescribe an agent for every part of the body with precision the subject will not then have been perfected. The functions of cells are various, and the character of the impressions of different drugs also varies. A remedy that will bring about favorable results in one case because of its affinity for a part, may fail in another, because different functions may be at fault, a differentiation beyond the ability of the most astute pre-

scriber to make, perhaps; a differentiation beyond the intelligence of everything except the subtle law of affinity. Evidently, then, even with the best knowledge we are likely to obtain, the treatment of disease will not be reduced to a practice of certainties. More than one trial may be requisite in order to select the proper drug from a group having affinities somewhat in common.

To illustrate, let us take the larynx and its drug affinities as an example. The leading drugs influencing this part are aconite, arum triphyllum, lachesis, potassium bichromate, potassium hydrate, spongia and stillingia. Each of these possesses an affinity for the larynx, but this is manifested when administered in therapeutic doses, only under certain circumstances. Aconite asserts its influence when acute disease of inflammatory nature is present, probably an influence exerted through the vasomotor center of the part, croup and subacute inflammatory states resulting from cold, being its principal field of usefulness. In chronic laryngitis where tissue change has progressed beyond the control of the circulation it would be useless to attempt to bring about a favorable change with this remedy. Here arum, if there is ulceration, or potassium bichromate, if there is a hoarseness without ulceration, or potassium hydrate if there is ulceration with profuse catarrhal discharge, (muco-purulent,) or stillingia, if there is chronic inflammation with history of struma, will be applicable.

But these indications may not be clearly pronounced. The classifications and indications of medical writers are convenient as landmarks or suggestion of remedies, but in practice we do not find these indications very clearly set forth in all cases. There might be an inflammatory condition pointing to aconite as the remedy which spongia would control more readily, and the reason for this be difficult of explanation. There might be an abnormal

state of the larynx giving rise to hoarseness without evident structural change, which potassium bichromate might fail to benefit, but which would promptly yield to arum, or stillingia, or potassium hydrate, or arsenicum iodide, or nitrate of sanguinarina, or verbasum, and the reason be entirely unexplainable because there are certain peculiarities of affinity which are not yet known.

Lachesis seems to influence the nervous centers of function and sensibility of the larynx in a pronounced manner, usually relieving cough of irritable character where the nervous element is predominant and there is little evidence of structural change, but sticta or nitrate of sanguinarina might fulfill this indication better, and it would puzzle the most astute observer to give the reason therefor.

It cannot fail however to prove advantageous to possess a wide knowledge of the drug affinities of every part. Such knowledge places us in the immediate neighborhood of means likely to cure, even though we must still be liable to necessity of numerous trials before the proper remedy is discovered. Long practice, close observation, or acuteness of intuition, may enable one physician to excel another in the selection, but the most indifferent prescriber must be able to do better than one who has not given this subject study.

There ought to be agents to encourage the growth of every tissue and to promote the normal activity of every function of the body. Many of these it is true are yet to be discovered, though we have already learned to differentiate with respect to different remedies having affinity for the same organ. It was once enough to believe that all remedies were cholagogues which influenced the liver in any manner. Now we entertain somewhat different views. The secretion of bile depends upon the action of a special class of cells to influence which, when impairment of action is

present, we require a special class of agents, of which chionanthus may be taken as a type. But jaundice may be the result of impairment not directly due to faulty function of the bile secreting cells, but due perhaps to faulty circulation in the hepatic blood-vessels and more amenable to such agents as cheledonium and nux, which probably influence the vaso-motor center. Or, the glycogenic function may be disturbed, and glucose precipitated into the general circulation. Then we must resort to syzygium or nitrate of uranium, until a larger list of this class of agents has been unearthed.

It is not improbable that with the liver, as well as with every other organ of the body, a better knowledge of the affinities of drugs for the tissues concerned in the functional activities in question, with increase of information respecting functions now little understood, will enable us to treat diseases heretofore considered incurable, successfully.

The general nutritive condition of an organ or part will demand special consideration, requiring in many instances a different class of remedies from those impressing its functions. However this need not invariably be the case, for structure and function are so intimately related that their therapeutics can hardly be completely separated. Schussler proposes to provide all the remedies required by a part, through the inorganic tissue-element predominating in its structure, but we cannot thus simplify the treatment of disease, satisfactory though it would be. The inorganic elements of the tissues constitute valuable therapeutic reliances under some conditions, but they often fail when apparently prominently indicated. The explanation probably lies in this differentiation between structural and functional therapeutics.

If new growths are ever brought under the controlling influence of drugs, it will be when a better knowledge of

their tissue affinities has been evolved. Grauvogl and others have asserted that cartilaginous tumors can be cured by the influence of silica, the effect undoubtedly depending upon the selective affinity of this agent for cartilaginous tissue, and its tendency to correct abnormality of the nutritive processes of the part. Thuja has long been extolled as a remedy for the cure of warty growths of skin and mucous membrane, given internally, though it is quite likely that more failures than successes attend such medication. Even as pronouncedly sceptical therapeutists as those of the old school are asserting the efficacy of magnesium sulphate as an internal remedy for the cure of warts.

Scattered throughout the literature of medicine, is much valuable knowledge of this kind which can be made more useful if given prominence through classification and other special notice. In another department, it is the purpose of the author to indicate some of the possibilities of this subject, and point out the principal information bearing upon it to be found in Eclectic medical literature, in such a manner as to adapt it to practical purposes. That all the propositions made in this Introduction will be fully enunciated, an emphatic disclaimer is here interpolated. It is the purpose to suggest more than can at present be demonstrated; for while this is the proper direction of study, for a fruitful field of therapeutics, much additional knowledge must be obtained before we can expect a fruition of all that seems promised. Some future author with more perfect physiological data, and larger accumulation of definite therapeutic knowledge, may carry this subject, thus imperfectly begun, to a better state of development.

The subject of tissue affinity, cannot cover the entire field of medical practice. The fluids of the body are not tissues, yet they often demand remedial measures, in order to correct conditions involving serious derangement of the

entire economy. It would not be straining a point much to assert that in acute disease, our principal therapeutic reliance must be upon agents which either directly or indirectly influence the fluids, while in chronic disease, we must depend more upon remedies which specifically influence the tissues.

Morphological elements of disease,—germs, promise to assume an important position in the field of pathology. Here we require an entirely different class of remedies. The disease in this case would really constitute an entity to be excluded or expelled, leaving aside the question of tissue integrity altogether.

Electricity constitutes a means of reaching a part when required, independently of specific drugs. It really possesses a tissue affinity of its own,—a general affinity, by virtue of the conducting properties of the tissues, which enable the physician to convey it to any part as desired, and thus produce a salutary molecular disturbance. Sometimes this proves more efficacious than the most potent drug.

Correct diagnosis, quality of drug, size of dose, proper selection, and susceptibility of patient, are important elements to be considered in connection with this subject. Neglect of these points will lead to failure every time; inattention to them has been the cause of much of the dissatisfaction and scepticism of the therapeutists of old.

Ability in diagnosis will depend upon knowledge of physiology and capacity of determining character and extent of deviation in disease. To the function impaired or perverted the proper remedy must be adapted through knowledge of its selective affinity, if a tissue be involved.

Quality of drug agent is as important as proper selection. Without doubt much of the difference of opinion among therapeutists depends upon want of uniformity in this direction. The average pharmacist is not conscien-

tious enough about the quality of his drugs, making it incumbent upon the careful practitioner, to be particular when purchasing or prescribing, that only those of known quality are accepted.

Size of dose and susceptibility of patient sustain a direct relationship. Dr. H. C. Wood asserts that susceptibility of a system to the action of drugs depends upon the extent to which it is specialized in structure and function. The cerebrum of man, for instance, is more highly developed than in the lower animals, and consequently more highly susceptible to the influence of medicines or toxic agents. The same author refers to the remarkable susceptibility of the frog, to the action of such agents as strychnia and opium, and draws an interesting comparison between the effects of the latter drug in the two cases. Opium has a double affinity in all animals: one for the brain and one for the spinal cord. In man, with the large and active brain, the agent exerts its selective influence upon this part, and somnolence and stupor result; while in the case of the batrachian, with the relatively larger spinal cord, the affinity is more prominently manifested in convulsions, consequent upon disturbance of the spinal centers.

In the human family we find almost as striking differences. The markedly lymphatic person and the individual of highly organized nervous temperament are almost as widely separated in their susceptibilities as the man and the frog. There is no doubt that the high attenuations of homeopathy sometimes effect cures, and that disease is often aggravated through highly developed susceptibility, by ordinary doses.

The effects of drug affinity are often modified by diet, climate, or other incidental influence, until remedial results are fully lost. The most approved skin remedies would fail to satisfy the expectations of the prescriber, if the

patient were subsisting largely on bacon or salt fish. In this case, also, the influence of a stimulating saline atmosphere might play a modifying part. Vesical and renal affections could hardly be expected to improve under the best selected remedies if the patient were following the impulses of alcohol addiction or habitually drinking water highly impregnated with calcareous salts. Cardiac affections could not be expected to improve rapidly, while the patient was indulging freely in coffee, or tobacco, or in immoderate bodily or mental exertion, or sexual indulgence.

It should be remembered, also, that the reflexes often play "hide and seek" with the indiscriminating practitioner. Surely the fault lies at his own door if he fail to cure abdominal neurosis dependent upon anal fissure, rectal pockets, hemorrhoids, or stricture, with colocynth, discorea, collinsonia, nux, cimicifuga, or other remedy that might seem demanded by the abdominal tissues. As reasonable would it seem to attempt the relief of cardiac irregularity hinging upon lacerated uterine cervix, chronic endometritis, or other structural wrong of the reproductive apparatus, with scutellaria, cereus, digitalis, or strophanthus. True, temporary relief might follow as a result of the specific action upon irritated nervous centers, but no permanent effect could reasonably be expected.

The intelligent physician will survey the whole field. He must do this in justice to the claims of therapeutics. No one but the charlatan will blindly prescribe without due inspection of all the premises. When rationalism becomes the guide, instead of superstitious faith in mysterious remedial action or blind following of a therapeutic law, there will be more certainty in the practice of medicine.

THERAPEUTIC CLASSIFICATION.

In the study of therapeutics, classification formerly constituted quite an imposing feature of the plan pursued. Writers were disposed to give more attention to the arrangement of the materia medica into groups suggestive of the general action and use of agents, than to the individual study of each drug separate from its analogues. More modern writers, recognizing that much of the knowledge of the best virtues of remedies was thus overlooked, have discarded the plan of classification, and given the individual study of each drug separate attention, ignoring the grouping of agents altogether.

Individualization is, without any question, an excellent plan to pursue in therapeutical research. This is so because every drug is peculiar to itself in one or more respects, and upon such peculiarity may depend its most sterling quality as a curative agent, while in the generalization of old methods of classification, this very quality was the one most liable to be overlooked. Still, a comparison with analogous remedies has been found advantageous frequently, in order to emphasize some peculiarity of the agent under study, and impress it more forcibly upon the mind of the student.

But we cannot afford to discard the old classification altogether, for it includes some very essential resources which are often imperatively demanded. It comprehends, in the majority of cases, the physiological or pronounced drug effect of medicines,—an effect, apparent whether drugs are administered in health or in disease, so marked as to indicate disturbance of function as the result; yet such action is often desirable.

However, our knowledge of the healing art can be facilitated by the addition of a new classification, which will

recognize a finer effect of medicines, than that resulting from the old-fashioned, crude dose.

The "dual action of drugs" of numerous writers, is a misconception. A drug invariably acts in one direction and in the same manner, except that in a large dose, through *excess* of action, it may become a disturber of function or structure to the extent of arrest or impairment, while in a sufficiently small quantity, it may produce the proper disturbance necessary to healthy rearrangement of molecular elements, and thus result in favorable change when disease is present.

Upon the ground of dose, then, remedies should be divided into two general classes, the same remedy quite often appearing in both divisions, as its effects are modified by amount administered.

Take ipecac, for example, a drug which in certain doses disturbs the gastric functions violently, the disturbance resulting in nausea and powerful inverted action,—vomiting. Here we have no augmentation of function, but instead, an abnormal condition is for the time set up,—an artificial disease. In other words, the so-called physiological action of the drug is made manifest.

How does a minute dose of the same agent affect the stomach? for it, as well as the larger dose, manifests a selective affinity for the gastric centers. Administered to a healthy person in doses too small to produce unpleasant sensations or other appreciable effects, its influence might be considered absent, yet in the same doses, when nausea and vomiting occur in disease, with irritation of the parts and disturbance of function, it tends to correction of the abnormal state. This is an example of a great number of instances where the large dose disturbs or arrests normal function, while the small one conduces to restoration when the disturbance is that of disease.

Dose, then, would divide a large number of remedies

into two general classes, of which we might christen one *dynamical*, its agents acting in unison with the forces of normal life, and the other *statical*, because its members oppose or arrest, for the time at least, such action.

Not all remedies, however, can belong to these two classes ; quite a number of agents exhibiting excellent dynamical properties, manifest little if any physiological action, even in exorbitant doses. Olden-time therapeutists would have pronounced such agents inert, because of this, but the excellent clinical effects resulting from their use fail to justify such a verdict ; triturated oyster shell (*calcareo ostrearum*) is one of these, and silica, another, both possessing rare dynamical properties—as well as a number of others, which the *materia medica* could ill afford to spare.

Both kinds of action are of value in the management of disease, when the physician is liberal enough to avail himself of them ; but the average homeopathist disdains the physiological effects of drugs, except so far as they serve as indicators for use in dynamical doses, while the adherent of old prejudices is unwilling to entertain belief in the attenuated doses essential to successful dynamical action. Thus for many years lack of a genuine eclectic spirit hampered the progress of medicine, until it fell behind in the march of the ages.

In the growing interest in the study of dynamical drug action, importance of the frequent necessity of the uses recognized by the old classification, should not be forgotten. The derivative effect of a drug, or the detergent action of another, or the soporiferous influence of a third, may be found the action most desirable, for the time, at least, in the treatment of a given case. Emetics, though for a time perverters of function, are an important item of the wise physician's resources—not confined to those cases where simple evacuation is indicated, by any means.

The follower of Thomsonian methods might attempt too much with this class of remedies, and do harm by indiscriminately subjecting his patients to emesis; this, however, ought not to be employed as an argument against their proper use to fulfill important indications when so demanded. Cathartics were abused in the days of ignorant and superstitious medicine, until many physicians, as a result of the reaction consequent upon a better knowledge of physiology, avoid them altogether; still, while we realize that cathartics disturb the alimentary functions, and are but sorry promoters of secretion as a rule, a peristaltic persuader is occasionally very essential to a successful and satisfactory practice. As much might be asserted of the majority of agents recognized by the old classification. Then why abandon them? better retain the old, and add the new.

The importance of minuteness of dose, in order to derive satisfactory dynamical results, must not be forgotten. An abnormal state of a tissue or organ may render it extremely sensitive to drug influence, and all the good effect hoped for may be neutralized by impressing the part too powerfully. People are, ordinarily, unfavorably impressed with the idea of influencing vital processes with the minute doses proposed by those who deal in the dynamical action of drugs. Especially is this so with the student, if the ideas of therapeutics which have characterized the old school have been his early impressions. Much of the fine and accurate knowledge of therapeutics has been lost through prejudice.

Dynamical remedies may be divided into two groups, though the line between them is not clearly marked in all cases: From the inception of embryonic life the two essentials of existence and development are *plasma* and *plastic force*, and these essentials are paramount throughout the life of the individual. There must be a properly prepared

material for the supply of the body, and this must be properly distributed, while each part must possess the ability of appropriating that which is most needful for its special wants.

The *plasma* remedies include but a small number compared with those of the other class. Alteration or depravation of the fluids of the body offers indications for their use. Sodii sulphis is a prominent one of this class, indicated when the blood depravation manifests itself in pallidity of mucous membranes, with pasty white coating on the tongue. Acidum sulphurosum is indicated when the tongue is coated brown, and brown sordes collect on the lips and teeth; acidum hydrochloricum, where the tongue presents the color and general appearance of beefsteak.

Such are examples of corrective action by virtue of chemical influence—at least in the cases of sulphite of sodium and hydrochloric acid; for blue litmus paper is reddened by contact with the pasty white coating of the former, while the slick, dark-red tongue of the latter affords proof of alkalinity by the characteristic reaction with red litmus.

However, it is not impossible that a dynamical action may attend, the action being chemico-vital, instead of a purely chemical one. Certainly, in the case of baptisia the corrective action cannot be considered a chemical one, the influence being exerted dynamically entirely, as there is no evidence of its being an antiseptic outside the body; and yet it proves a corrective of rare virtue in certain cases when administered internally.

The subject of “potomaines” is one at present engrossing professional attention. These are a class of putrefactive alkaloids generated by bacteria, in septic processes in organic matter. Since attempt to discover remedies destructive of bacterial organisms has apparently proven futile, a disposition seems manifest on the part of some

of the germ theorists to abandon this line of research, and seek to correct the evils of germ infection by neutralizing or eliminating the poisons generated—though not all potomaines are poisonous.

Each class of bacteria is supposed to generate a specific ferment (potomaine), which is peculiar to the special disease it creates. For example: The typhoid fever bacillus can only produce the potomaine typhotoxine, while the bacterium of tetanus must be present for the generation of tetanine. Such propositions, though yet hardly ripened, approach the position long held by the Eclectic school; and though we have not given as much attention to the microscopy of disease, we have more than anticipated the results of their search by recognizing, virtually, the presence of putrefactive ferments, and specifically adapting remedies to their correction, the credit being due in great measure to the clinical observation and inductive reasoning of Scudder.

It is not the purpose to more than allude to the plasma remedies in this place, for they will be fully treated in a special department. Suffice it to remark that they constitute an important, frequent, and satisfactory source of supply to every inquiring liberal physician.

The *plastic* remedies are the tissue remedies proper; they possess an affinity for the tissues, selecting and differentiating, in a manner entirely unexplainable. The nuclei of the cells are probably the primary point of impression; at least, the nutritive quality of the cell is generally believed to be the elaborating center, through which new protoplasm passes, upon its arrival, before being adapted to the uses of the part. Thus every cell is specially constructed for its purposes, and if normal conditions fail, the therapeutic agent probably impresses it to restore the proper activity. Let us suppose so.

Tissue remedies act in various ways upon a given part.

One may influence the nutrition of the cells, or of the nutritive center, in such a manner as to encourage retrograde metamorphosis and the building of better structure, thus being applicable to chronic lesions, where there is considerable alteration of tissue. Another may influence the circulation in the part through the vaso-motor center, and thus relieve acute congestive conditions. A third may affect specifically some function, and still another may be adapted to a painful state of the part—a myotic or neurotic agent.

Knowledge of the selective affinities of drugs may be determined by experimentation,—by what the homeopathist would term “provings,” or the modern old-schoolman the “physiological action”—but such differentiation as that here referred to must be determined by clinical experience.

It will be observed that this variety of purposes must demand a multitude of remedies; we cannot construct a materia medica upon this plan, by reducing the number of agents. The most effective materia medica will include a goodly list of remedies influencing each part collectively, but embracing a variety of therapeutic properties, that numerous changes may be rung, to adapt the treatment to the different pathological conditions liable to be present.

Plastic remedies influencing a part might be divided into remedies of nutrition, of function, remedies for vascular disturbance, for myalgia, for neuralgia, etc.; but this might prove confusing, as two or more of these properties may belong to the same drug, and it would therefore be perplexing to attempt such arrangement; it would be difficult to set apart a list of nutrition remedies which do not influence in greater or less degree the functions of the same part, and these might relieve painful states by reason perhaps of such influence.

It would be better to divide the plastic remedies into classes to correspond with anatomical parts influenced. For example: Remedies which influence the osseous system might be grouped, without reference to any common property except that of affinity for such structure. With this in mind the differentiation would not be difficult, and if doubt existed as to the proper selection, such grouping would readily suggest the agents for trial by rotation; and this plan might apply to every tissue of the body.

But we must not stop at classification upon the basis of structure alone; every organ possesses its group of remedies, which manifest specific affinities for it. This fact was recognized in much of the crude practice of the ancients, which seems to have consisted largely in the administration of purgatives, until "regular" medicine added digitalis for cardiac affections, cantharis for its influence upon the genito-urinary sphere, and a few other inconsequential specifics. Organopathy,—therapeutics directed to the influencing of organs,—however, seems to have received tacit recognition throughout the history of medicine, though much of it has been of a very crude character.

Plastic remedies become plasma remedies in an indirect way when they specifically correct perverted states of the blood-making organs, when they regulate hepatic abnormalities, by which there is an overflow of bile into the general circulation, or when digestive disorders result in abnormal elements to be precipitated upon the kidneys. There is such an intimate relationship existing between all the vital processes, that complete classification of dynamical action would be impossible.

Just where the line of demarkation between functional and structural disease lies, is a fine point for discrimination. "Whether it be possible," says Green, "for the function of an organ or tissue to be abnormally performed

quite irrespective of any alteration in its structure, admits of some doubt. At all events, as our methods of minute investigation improve, and our knowledge of morbid histology increases, the class of functional diseases grows less; and although there still remain a large number of diseases in which we are unable to recognize any alteration of structure, and which, therefore, must still be described as functional, it is probable that all disease will ultimately be found to be attended by more or less structural change."

Upon such grounds it would be quite proper to class all those remedies markedly influencing the functions of an organ or part as plastic remedies, though in doing so more or less encroachment on the domain of the plasma remedies would result in certain instances. However, it is not technical classification we should aim at so much as rational methods of grouping, for satisfactory selection.

Bacteriology has failed to develop an extensive list of agents adapted to the destruction of micro-organisms of disease. Still, a few remedies have promised something in this line; ozone has earned some reputation as an agent capable of arresting the inroads of cholera,—a disease supposed to be due to the presence of a specific bacillus, when generated in hospital wards devoted to its treatment,—and it has also been found serviceable as an inhalant to destroy certain organisms in the blood stream. Peroxide of hydrogen, bromine, chlorine, and other drugs, have been suggested, but they have not yet attained eminence; it remains to be proven that they are worthy to be classed among germ-destroying agents. In fact, some bacterial forms, as those of diphtheria, seem to be almost indestructible, resisting with surprising vitality immersion in boiling water, and strongest carbolic acid.

THE PRINCIPLES OF SELECTION.

The selection of remedies for disease expressions is a subject which may be discussed with profit, for it is one requiring much thought and study in order that the highest excellence may be attained in the art of adapting therapeutic agents to the various phases of pathology.

The characteristic of modern medicine is, that in this respect—as well as others—an attempt to proceed on rational grounds is prominent in the mind of the physician; the custom of grouping symptoms, giving them a name, and applying stereotyped treatment, has become obsolete. The progressive physician of the present seeks to thoroughly analyze each individual case, before proceeding with its treatment.

There is too much positive knowledge of therapeutics at the present time to admit of an excuse for empiricism, except perhaps in a few instances where the testing of drugs is the object, or where obscureness of diagnosis or want of clearly defined expression leaves no alternative; there are many avenues open to intelligent prescribing.

Rational medicine rests upon the foundation of a liberal education, embracing knowledge of the laws of normal life, of the processes of disease, or abnormal life, of the physiological action of drugs, of their dynamical action and clinical effects, as well as the value and applicability of many adjuncts to therapeutics, such as electricity, massage, and climato-therapy.

It is an important qualification to be able to know when not to administer drugs, as well as to know what to select at the proper time. The principles of selection should involve so wide a knowledge of the collateral branches of medicine that the physician would make no mistake in this respect. The practitioner who persists in

administering *pulsatilla*, *leontin*, *cimicifuga*, *lillium tigrinum*, *sepia*, or *hydrastis* for the symptoms arising from irritation due to chafing of a lacerated, everted uterine cervix needs to extend his reading and widen his lines of thought. There are many conditions, also amenable to drugs, which may be relieved more promptly by other measures and measures which it would be profitable for the practitioner to adopt. Saint Vitus' dance may sometimes be cured with drugs, but electricity so infinitely excels their action that they are not worthy of recognition in such a case. An excessively troublesome erythema may be made to yield to *rhus*, *apis*, *juglans*, or *arctium lappa*; but as the relief of the troublesome pruritus might be the desideratum and in fact the indirect cure, a topical application might be found the short and commendatory way of affording relief. The most scientific method is that which succeeds best.

THE OLD CLASSIFICATION

Offers many indications for remedies which are not worthy of mention here, for they are so simple and apparent that little study is required for their recognition, while many of the indications must become obsolete for reason of the adoption of modern ideas which ignore their utility. The physician who marches not with the progress of the times but remains wedded to old ideas is laboring under an incubus.

The old classification arose when disease was regarded as an entity—a tangible devil to be forcibly expelled from the body, and the harsh and violent agent, one which commended itself by its unpleasant effects, even though it prostrated the patient nigh unto death, was employed. Large doses of powerful drugs was the fashion then and unfortunately a fashion it has been very difficult to change.

The conclusions arrived at by the ancients as to the ex-

pressions of disease were often crude and erroneous, for their light was a dim candle beside the better illumination of the subject afforded by later advances in physiology, pathology, and therapeutics. Constipation was considered an infallible indication for the use of a cathartic. Diarrhea demanded an astringent. Pain called for a narcotic.

We now realize that though constipation may occasionally indicate the need of a cathartic, it may really call for the very reverse; if physiology teaches any lesson here it carries the conviction that the customary use of cathartics is bad practice. Astringents used to arrest a diarrhea, might aggravate an irritation upon which the flux depended and thus prove but sorry relievers of the condition, even though temporary arrest might follow; the modern therapist relies upon something more specific than the general property of astringency, in such cases. Narcotics induce a temporary suspension of nervous sensibility—paralysis—for a time, and also suspend in a measure important vital functions, and are to be avoided when there are reliable indications for remedies which relieve by correcting perversion of vital processes giving rise to pain.

The rationalism of early medicine was of the most primitive kind. There is a simple rationalism in the use of an emetic to remove morbid accumulations from the stomach, and in the use of a cathartic to rid the alimentary canal of irritating material, which, retained, might be the occasion of disease of that part. It is certainly reasonable to administer a narcotic to relieve severe pain, until curative measures succeed, and in the use of a hypnotic to invite slumber when insomnia has distracted the nervous energies; or of a counter-irritant to divert inflammatory action from an important internal organ; but all this is so simple that the ordinary person grasps the idea almost as readily as the physician.

Such rationalism constitutes the simple elements of practice and is extremely clear in its propositions. It consists in the application of agents for the removal of causes of disease, which are so prominent as to be recognized by the unsophisticated,—of the paralyzing of the entire nervous system for the relief of localized pain, or the lulling of hyper-sensitive nerves through the charging of the blood with lethal agents,—simple propositions familiar to the ancients though some of the agents employed may be new.

If this practice constituted the sum total of medical rationalism, the elaborate and laborious researches of the biologist might as well have been neglected. Such means and measures are largely perversers of function, and though they may indirectly serve as restoratives, the primary action should be dispensed with at as early a period as is consistent with success.

DYNAMICAL THERAPEUTICS.

But a change has taken place in the ideas of therapeutics. Disease is no longer regarded as an entity,—something to be driven out, but as an absence or perversion of some factor essential to healthy action, a condition calling for such means as tend to foster, encourage, and restore vital activities,—as a condition in which medicine may encourage a lagging function, neutralize a septic tendency, or supply a lacking element; and as a condition precluding the embarrassing effects of heroic doses of drugs, if healthy action is to be readily restored.

When we enter upon the domain of dynamical therapeutics, we deal with a class of agents which directly and specifically influence vital operations. It is no roundabout action we are now considering; the function of dynamical remedies is the direct influencing of disturbed processes in such a manner as to turn them into normal channels

and bring about restoration of physiological life. We here deal directly with the corrective and restorative properties of drugs and their affinities for affected parts, organs, or functions.

A rational application of dynamical therapeutics must rest upon the foundation of biology, the science of life. Not that it must be expected to always prove a remedy upon the healthy person, in order to render its place in the materia medica definable, but the remedy applicable to each function of life must be learned either by experimentation or by clinical experience, and when disease occurs, with deviation of that function, the remedy which by its selective influence impresses the part or function favorably, must be administered in doses just sufficiently large to exert a kindly restorative influence.

Remedies hardly or never succeed in completely restoring a part after its histological elements have been altered, for though apparent recovery may follow judicious medication, an increased susceptibility to disease remains for a long period if not for a life-time; still, its vitality may be improved and its functional activity augmented until an apparent state of health exists, and with a knowledge of the remote effects of disease, the vitality of the part may be guarded from exposure and injury to the full and satisfactory performance of all its offices.

It will be long before the scheme of dynamical therapeutics can be perfected. The therapist must bide the time of the physiologist. The mystery of vital force is not yet explained. The complexities of the nervous system—the location of centers of function, the bewildering maze of reflexes, the puzzle of ganglionic masses and decussating fibers—the functions of the ductless glands, these and other problems must be solved before it can be hoped to complete a scientific system of therapeutics.

Meanwhile the work of the past can be continued—the

annotation of isolated facts, which may sometime serve as links in a completed chain of reliable data. Until then it may be best for medical men to regard the present knowledge in a candid light—thankful for what has been acquired, though the information already possessed may seem but as a series of uncertain glimpses into an endless field of supply.

Do the best we can, there is more or less uncertainty about the practice of medicine. Careful grouping of agents according to the part or function impressed narrows the field of uncertainty down to a point much short of older methods of gross empiricism, but not enough is yet known that a drug may always be adapted to a given case on first trial. In order to overcome such objection, a number of agents should be at command; we should be able to draw upon a list of several remedies similar in action, but each possessing some individual merit and peculiarity; then if one should fail we are not at loss for other means.

RELATION OF PATHOLOGY TO DYNAMICAL THERAPEUTICS.

Investigation of the nature of disease has advanced the standing of medicine greatly in modern time. The *post-mortem* study of diseased structure—pathological anatomy—has done much toward affording clearer ideas of morbid processes and suggesting rational methods of treatment. Better and more appropriate classification of disease has been the result of added pathological knowledge, and it has moreover cleared up some obscure phases of etiology, thus affording important assistance in the adaptation of remedies to abnormal states.

Knowledge of pathology is an important aid to the therapist. Take, for example, such a disease as typhoid fever. Here we may have a variety of therapeutic indications manifested during an epidemic, or even during the progress of a single case, but in all a knowledge of the

fact that much of the force of the disease is usually spent upon the intestinal structures—Peyers' patches—prompts us to guard these tissues from beginning to end, and we administer baptisia for this purpose, without regard to other indications or remedies, believing that it specifically influences these parts to sustain their vitality.

In numerous other cases the same principle applies. With a knowledge of the pathology of a case, of the part liable to suffer damage from the affection, or of the tissues suffering most severely, and of remedies which influence the restorative powers of the part favorably, we may be able to make our therapeutic selection upon rational grounds.

Knowledge of pathology also enables us to direct our treatment to the correct purpose when there seem to be indications for remedies in an opposite direction. Take senile gangrene, for instance. Here the natural impulse with one unacquainted with pathology would be to attempt to control the progressing death of an affected extremity, due to occlusion of the supplying artery, with stimulants and antiseptics locally and constitutionally, when pathology would suggest the administration of such remedies and diet as tend to aid the circulating fluids to hold in solution calcareous material and dissolve obstructions in the arteries, already formed, that blood may permeate the starved tissues.

A knowledge of the pathology of fever enables us to rationally provide by therapeutic means, through the employment of the sedatives, nourishment, and proper management in other respects, against the grave tissue changes that might otherwise lead to fatal results.

However, important as the subject is, pathology attracts but little attention in the field of therapeutics—in the adaptation of remedies to disease. Here we must rely upon *expressions*—symptoms which seldom have ref-

erence to nosologically indicated conditions, stereotyped treatment after nosology being of the things of the past. There must be a direct relationship between expressions, *indications*, and remedies, without particular regard for pathology. Here symptoms might not afford definite indications of stated pathological states and might manifest themselves at a distance from the actual place of morbid process.

Observation of tissue activities is as difficult during disease as in health. *Post-mortem* conditions cannot demonstrate the processes by which the alteration of previously healthy tissue is brought about, nor can these processes usually be studied during activity.

True, the web of a frog's foot, the ear of a rabbit, or a fold of the intestine of one of the lower animals, may afford an opportunity of observing the prominent changes taking place during the course of inflammatory action, but the symptoms, pain, heat, redness, and swelling, are taken into account more after all than these, in the selecting of remedies for the relief of the condition. However, the skillful practitioner bears in mind his knowledge of pathology, and it constitutes the basis or underlying principle of all his prescribing.

Pathological processes in the skin, the epithelia, and the eye, are open to ready and frequent observation, yet the therapeutics of diseases of these parts have not progressed more rapidly than of those not so situated. Certain of the functions of cells, as motion, growth, and reproduction, can be observed through the microscope, and some of the changes of disease thus made note of, but to trace connection between such changes and the impressions of a therapeutic agent, or to be able to adapt an agent to specific cell function, must depend upon experimental research and clinical experience.

Then we can only infer, perhaps, that particular patho-

logical processes have been influenced from the fact that physiological action has been re-established rather than from ocular evidence that specific changes have been wrought. The manner of action of most remedies is unknown, except as regards the gross results.

True, Brown-Sequard observed contraction of the capillaries to follow the introduction of belladonna into the circulation, and the corollary of its administration in capillary congestion with successful result followed. Contraction of the arterioles has been observed to result from the influence of ergot and hydrastis, the latter causing contraction of the muscular fibers of the coats of the vessels without producing a general action upon the muscular system at large; but not very much of value therapeutically has accrued from these observations, the empirical use of both agents for disease expressions having afforded more practical knowledge; for the circulation exerts but a relative influence upon cellular and intercellular changes. Still, the importance of the physiological action of drugs should not be underestimated; all knowledge of this character will sometime find its legitimate place.

Doubtless, knowledge of pathology will afford some aid in the selection of the remedies of the future, as it has in the past; and knowledge thus gained will be of reliable and substantial character, not to be supplanted by more positive measures; but it will hardly be possible for the older plans of experimental test and clinical observation to be completely dispensed with.

Even in parasitic diseases, pathology only informs us of the nature of the affection and suggests the plan of treatment, not the means. The specific agent, to abate the abnormal condition must be determined by experimentation—by clinical research—exploration in a field entirely foreign to pathology.

The idea of the entity of disease has been a stumbling-

block in the study of therapeutics. Pathology has been investigated with tireless zeal for years, with the belief that the knowledge thus acquired would enable the physician to apply the corrective means in like cases.

But we should recollect that pathological processes are not subject to the same laws of constancy as those of healthy life. It is a biological principle, that in health the efforts of nature are in the direction of normal forms or types and normal functions, and these efforts are persistent through cycle after cycle of time, environment and other physical influences bringing about normal changes but slowly, ages being required for their full development.

Pathological processes are vital processes running riot, except, perhaps, when disease results from lack of nutrition. The character of disturbance or the normal peculiarity of the part may impress the pathological elements with characteristics rendering them susceptible of classification, but there is no fidelity to fixed forms except in the influence that normal processes may still exert under the embarrassment of morbid surroundings.

RELATION OF PHYSIOLOGY TO DIAGNOSIS AND THERAPEUTICS.

The successful correction of pathological conditions by therapeutic means then will depend upon the favorable influencing, not of pathological processes but of the normal energy that may remain. The sooner we can influence this element favorably after departure from health, the more readily we may turn the deviated forces back into normal channels and stay the gross results of abnormal deviation—pathological change.

Evidently therapeutics could not be systematically applied to pathological states, for there would be no uniformity of condition for constancy of application or reliability of action. There must be a reciprocity of action between the influence of the remedy and the normal functions of an affected part, in order that recuperation may follow.

Health then being the point of departure, it should constitute the standard of measurement with which every abnormal state should be compared. A knowledge of physiological constants should be familiar to every physician, that character of deviation as well as probable amount may be estimated, the estimation looking toward therapeutic selection, or *drug* diagnosis, as well as diagnosis upon the basis of disease nomenclature, and prognosis. Nor is a knowledge of physiology as taught by books all to be desired. The senses of the practitioner must be trained to accuracy to detect many expressions that a knowledge obtained from written authorities alone, would leave out of the question.

An intimate personal acquaintance with the expressions of health, one based upon all the trained senses can observe or detect, is as essential to successful drug selection as a knowledge of written physiology, for much that can be impressed in this way cannot possibly be taught by books. This is the part of the physician's education which, becoming better and better developed, as he devotes himself to his calling, assists in those happy perceptions and impulses that often help him out of dilemmas, and to which the term "intuition" has, not inaptly, been applied; he thus learns to observe what words would but doubtfully express, but which his own senses assure him to be deviations from health, and at the same time indications for this or that remedy.

The expression of the healthy eye, its luster, the condition of the pupil, the facial expression, the normal color, shape, and consistency of the tongue, its freedom from coating, the color, transparency, and suppleness of the skin, the soft, full, regular pulse, the easy and rhythmical rise and fall of the chest in respiration, the absence of abnormal odor, the comfortable pose and movement,—all these and other expressions of health impress the senses

of the observer so that he recognizes deviation with readiness, and aided by a knowledge of the affinities and other characteristics of drugs, he connects the deviation with some remedy specifically adapted to the correction of the disordered function.

But valuable as superficial inspection proves, it may, if trusted too far, become misleading and commit the physician to error. It cannot supply the place of well-adapted physical exploration, though it may be indispensable in leading up to the point where positive investigation can be satisfactorily begun. Physical diagnosis, auscultation, percussion, mensuration, palpation, thermometry, microscopy, urinary analysis, all the tests which science can afford, are of value in practice to aid in the selection of remedies.

The sense of touch might convey an idea of the temperature which the thermometer would materially correct; impressions of the character of the respiration formed from superficial inspection, may be very much altered and even proven eminently erroneous, and an entirely different line of remedies suggested upon resort to careful physical exploration of the chest; urinary analysis may convince the practitioner that his deductions based upon a superficial inspection are in error, and correct impressions which might lead to useless and harmful medication. With the normal standard as a guide, then, we train the senses to lead us up to the point where more exact methods of selection can be begun with well-defined purposes.

Knowledge of normal conditions enables the practitioner to readily recognize abnormal action, and knowledge of drug individuality combined with this enables him to readily refer, in many instances, to the appropriate remedy.

Suppose the pulse and respiration suggest cardiac de-

rangement, the suggestion must take more definite form before the practitioner can rationally decide upon the proper remedy, and a knowledge of the normal sounds enables him, upon auscultation, to determine still more accurately the condition present, and decide as to its therapeutic requirements.

The muffled, labored sound of effusion would suggest *digitalis*, *convallaria*, *adonis*, or *apocynin*; the rasping sound of valvular obstruction *silica* or iodide of potassium; the feeble, tremulous sound, indicating loss of propulsive power, would call for *nitro-glycerine*, *strophanthus*, or *lachesis*; the irregular, or intermittent sound would suggest *cereus speciosissimus*, or *scutellaria*; etc.

The grouping of remedies in dynamical therapeutics can be properly made only upon the basis of physiology. Remedies influence function, and in this manner effect restoration, when diseased structure can be repaired; they sustain no direct relationship to disease except by their influence upon normal structure, except in such cases as those of parasites, where the disease is an actual entity and requires expulsion.

THE BLOOD.

Naturally, in a general survey of therapeutics we essay those first which have relation to the fluids of the body. Old pathologists divided disease for study into disease of the fluids and disease of the solids. That any great advantage was derived from this classification remains a question; but from the fluids are built up the solid parts; the fluids are largely the solid parts in process of preparation, and it therefore seems more like beginning at the foundation of the subject to begin with parts approaching the completed structure. All parts of the body, fluid and solid, have been separated from the blood or else are constituent portions of it.

The blood serves the purpose of a navigable stream,

through which all parts of the body are reached by nourishment, medicines, and toxic agents, while certain parts of it, the red corpuscles, constitute carriers to convey oxygen from the lungs to the tissues, and return, laden with carbon dioxide. It also represents the aggregate of elements, in various stages of development, which are passing forward to the point fitting them for reception by the body, as well as certain elements of former structures, which have been broken down, and are seeking exit.

We have here, it will be observed, a circulating fluid subject to considerable normal variation in the proportion of its constituents at various times, and yet one very easily contaminated by causes of disease, and one which may become, in a measure, the disturber of its own rate of movement, inasmuch as it circulates in, and supplies, the vasomotor centers. Its quality also determines, in many respects, the quality of the solid parts supplied by it.

Anatomists divide the blood into plasma and corpuscles, and divide the corpuscles into two classes, red and white. The plasma, though a certain portion of it becomes solidified upon exposure to the air, represents the fluid portion, from which is obtained all the tissue supplies, except oxygen, and which holds in solution all the excretions, except carbon dioxide, these, as already remarked, being transported by the red corpuscles. The white corpuscles probably represent broods of red corpuscles in embryonic state of development.

BLOOD-MAKING.

Blood-making is an indispensable source of every function, and upon it depends the foundation of every structure. If we could know all the secrets of this process, and were able to adapt remedies to them with the certainty that we adapt phytolacca to the mammary gland in mastitis, collinsonia to the rectum in hemorrhoids, or

polymnia to the spleen in chronic splenitis, we could hold in abeyance many intractable forms of disease. But in the absence of positive knowledge we can only speculate, and though certain premises may seem to warrant some very positive conclusions, these are not yet indorsed by the acquiescence of physiologists.

The pabulum is supplied by alimentation, through the portal circulation on the one hand, and through the lacteals on the other, the material reaching the general circulation from the portal, after being more or less elaborated by the liver, and from the lacteals after the impressions of the mesenteric glands have been made.

These primary impressions are essential in order that the elements of food may be kindly received. If faulty glandular action permits food products to enter the blood in too raw a state, an effort is at once made by the emunctories to remove them as extraneous matter, and serious disease may result to these parts in consequence of such taxation.

It is hardly probable that this new material is fitted to the important demands of the delicate operations of secretion and nutrition immediately upon introduction into the general system; the anatomy and general functions of the lymphatic system suggest that it is exuded by the capillaries of the general circulation and returned to the blood stream through the lymphatic system, the succession of glands traversed serving as a series of scaffoldings by which it is successively raised to a higher level of excellence as a means of body maintenance. Possibly several rounds of this character may be necessary before the plasma is fitted for the offices of a storehouse for the needs of life.

Much then must depend upon a normal activity of the lymphatic system. This has been recognized by therapeutists as a correct proposition for a long time, and the

class of remedies supposed to favorably influence the functions of the lymphatics has been regarded as an important collection of remedial agents. However, little progress has really been made beyond a vague idea that the class known as alteratives produce some favorable influence upon the lymphatic system in scrofula and syphilis.

Some authors stop short of this point in their ideas of blood-making, and propose to influence the entire process by the impression made by drugs upon the digestive functions. Good digestion is certainly important to assimilation, but the majority of cases of imperfect digestion depend more upon faulty action of those organs which elaborate the nutritive elements of the food after they have left the alimentary canal, than upon lack of digestive power. They are the result of that backward wave which might be likened to a smoking fire-place, due to an obstructed flue—to interference with the normal flow of the products of digestion through the liver and lacteals.

With the blood-making processes in good action, functional dyspepsia can hardly exist, though we must recollect that local causes are often at work in faulty digestion, these cases being the exception, however, rather than the rule.

Faulty plasma-making may sometimes be corrected by supplying factors which the glands are unable to obtain from the food. The inorganic elements of the blood, though present in sufficient quantity in a mixed diet, may not be properly extracted and appropriated. Here these elements should be supplied by the therapist. Salts of sodium, potassium, lime, and magnesium, constitute valuable adjuncts in such cases.

The mode of origin of the red blood corpuscles is yet a vexed question. In the embryo, there seems a marked similarity between red and white corpuscles as regards

their appearance and properties, the only distinction being that of color. Here the red corpuscles are granular, nucleated, exhibit amœboid movement, and multiply by subdivision. Later in fetal life, non-nucleated red corpuscles originate from the cells of connective tissue. In adult life this origin has been observed in the connective tissue of the marrow of bones.

It is not unreasonable to suppose that connective tissue is the breeding-place, so to speak, of the red corpuscles, at least the locality in which they reach the maturity of adult life. The white corpuscles probably represent a transitional state of broods of these cells; histologists record the fact of having observed red corpuscles protruding from white ones while they were moving along the capillaries, in support of this proposition.

Originating in the connective tissue of the lymphatic glands, the white corpuscles are for a time bathed in a fluid purely nutritious. Entering the blood stream later, their actions are remarkable. Here they exhibit characteristics entirely at variance with those manifested by the red corpuscles, which hurry along with the current as though impelled by some attraction. But the white corpuscles lag, appear to adhere to the walls of the capillaries, and seem to possess an attraction for the surrounding tissues. Closely watched, a white corpuscle after a time is seen to pass through the capillary wall into the connective tissue—a normal process termed “diapedesis,” once supposed to be peculiar to inflammation, but since demonstrated as a vital characteristic.

What is the significance of all this? The lower forms of life present us with many examples of transitional states during which the development of the adult is progressing from embryonic forms. Connective tissue cells have been proven as the origin of red blood corpuscles in

certain cases. Connective tissues are liberally supplied with nutritive material and possess a remarkable power of abetting cell proliferation under such conditions as that of inflammation, which proliferation of new elements may fairly be regarded as a normal process exaggerated by the excitement due a hyperæmic condition.

Leucocytes may represent broods of red blood corpuscles which, arriving near maturity, are conveyed to the connective tissues and there liberated for complete development, after which they enter the capillaries, through the attraction due their new endowment, and fulfill their mission of carriers of oxygen and carbon dioxide until aged, and broken up.

Red corpuscles have been observed to pass through the capillary walls, but that they pass inward during health we have not as yet testimony to affirm.

However, clinical experience seems to indicate that those means which promote activity in the connective tissues are most effective in the correction of anæmia. General faradism, massage,—such measures as these can hardly be excelled in impoverished states of the blood where red corpuscles are lacking. As for medicament, iron often aggravates anæmic states, and is most impotent to bring about favorable changes, though normal processes may restore patients being drugged by the various ferruginous preparations.

Evidently, a few drugs exert some favorable influence upon the blood-making processes. Agents promoting functional activity of the lymphatic glands must promote the birth of blood corpuscles if here be their place of origin, and remedies favoring activity of the connective tissue cells must further the process if here be where they hibernate until fully developed. Massage and electricity permeate the tissues and reach the areolar structures directly. Cuprum and a few other drugs, perhaps,

specifically influence the blood-making organs, though the influence is feeble beside that of the agencies of the electrician and masseur.

THE GENERAL CIRCULATION.

The general circulation consists of the distribution, by the aorta and its branches, of oxygenated blood from the left ventricle of the heart to all the tissues of the body, and its return, after circulating in the capillaries, by the veins, to the right auricle.

This circulation serves as a great irrigating system to the body at large. The heart acts as a force-pump to impel the blood onward in the elastic arteries, which, throbbing under its impulse, aid by their elasticity in impelling the stream to the capillaries, where the real functions of the flushing begin.

Here, as the blood slowly moves along the transparent delicate-walled canals, the interchanges between the stream and tissues take place. Pabulum passes through into the intercellular spaces for the nourishment of the histological elements, broken up and worn out material passes outward to drift away in the stream, oxygen responds to the attraction of the tissues, and displaced carbon dioxide joins the red corpuscles for a journey to the outer world.

The alternate pressure of the heart's impulse from behind, the attraction of the tissues for the newly oxygenated corpuscles, and other forces, perhaps, serve to move the mass steadily onward, until the changes having been completed, the veins gather up all the diffused fluid, and pass it through one gateway, the right auricle, into the vessels of the pulmonary system, for rejuvenation.

Meantime important side issues have been going on. The abdominal aorta has contributed, through a number of large branches, blood to the abdominal viscera which perform certain offices of digestion and assimilation, thus

setting apart a separate, peculiar circulation, the portal, and distributing a second set of capillaries—to the liver.

The renal arteries have ramified into capillaries which have been in close relationship with glandular and osmotic forces that have separated a certain portion of nitrogenous waste material, in the form of a watery solution of urea, uric acid, and other elements, as urine; the capillaries of the skin have been giving off other waste products, while the pancreas, liver, gastric glands, and other secretory organs, have been separating and appropriating from the general stream, certain substances for further use in the economy; thus secretion and excretion perform their offices as a part of a harmonious plan, as the regular round goes on.

The action of the heart is regulated by the influence of the cardiac nerves, and the caliber of the vessels determined, through branches from the vasomotor centers, so that supply and demand, waste and renewal, are nicely adjusted, the blood maintaining an even temperature of 98.6° Fahn., the pulse or heart stroke numbering near 70, and the respirations 15 to 18 per minute.

But disease seriously disturbs this nicely adjusted equilibrium, and disarranges the entire economy; and disturbance of a single function is reflected throughout the entire arrangement.

Suppose the blood is hurried along more rapidly than at the usual rate, respiration becomes excited, the heart and arteries respond to the stimulus and contract more rapidly, the governing centers becoming disturbed by the presence of excess of oxygen. Increased oxidation gives rise to increased temperature, for oxidation is a literal burning, and as the blood rushes upon its round with undue rapidity, all the functions of growth, of secretion, and excretion, become disturbed. The urinary elements are now but partially removed, the skin becomes dry, secretion arrested, all the vital forces impaired, and destruction

of tissue ensues, as evidenced by emaciation, debility, and, perhaps, impairment of the mental forces.

Suppose on the other hand there be a failure in the impelling power of the circulation,—failure upon the part of the heart or blood-vessels to perform well; the stream moves but slowly, and the capillaries are filled with blood but partially supplied with oxygen, for the pulmonary circulation receives but a compensating impulse. Oxidation of tissue, the removal of carbon dioxide, the distribution of pabulum, the transportation of waste material, go on imperfectly, the vital organs and the nervous centers,—all parts are imperfectly stimulated, the blood becomes loaded with waste products and the entire body suffers.

The normal rate of the circulation cannot be disturbed long before the quality of the blood deteriorates; this would result if lack of nourishment and increased breaking down of tissue, which must follow from disturbed circulatory function, were the only causes, but a more important one, in many acute diseases, as fever and inflammation, is the generation of septic elements,—potomaines(?) which tend to seriously threaten the continuation of existence, through rapid development, and depressing influence upon the nervous centers. Blood depravation becomes manifest in numerous ways, but the tongue is an important index here, not only to denote the advent of the septic element, but also to suggest the appropriate remedy for its correction.

A febrile or inflammatory state does not continue many days before the tongue manifests the tendency to such changes, and when an indication of this kind becomes prominent, it should not be neglected. In treatment, it is well to recollect that the means which will control disturbance of the general circulation, applied early, may avert all danger of septic changes, by allowing the excretory organs to rid the blood of the disturbing and zymotic

element, which tends to rapidly reproduce itself. Later, means looking to the direct correction of the depraved state must be applied.

A special group of remedies, by virtue of their specific influence upon the cardiac and vasomotor centers of the general circulation, prove very reliable means of controlling excitement, thus augmenting the functions which tend to free the blood of zymotic material. These have been termed the "special sedatives;" the leading ones being aconite, gelseminum, jaborandi, and veratrum. When properly adapted, they calm and strengthen the governing nervous centers, contribute to normal heart action, and arterial impulse, invigorate the capillaries, and in this manner encourage secretion, excretion, and all other functions concerned in the circulatory processes.

But if septic changes have begun, the case has passed beyond the reach of these remedies, for while they may still modify the excitement, in a measure, the provoking element persists, and tends to the increase. Here a neutralizing agent must be applied, to act as a dynamical corrective. Then we have resort to the salts of sodium, when the tongue presents the white coating and pallid mucous membrane, acids, when the dark red color of tongue and mucous membranes prevails, or other correctives, as clinical experience has previously suggested. Baptisia serves as a corrective when prune-juice discharges, indicating gangrenous tendencies of mucous surfaces, are present; chlorate of potassium, when feculent odors pervade the exhalations; chloride of potassium, when plastic exudations threaten mischief; or lachesis or echinacea, when systemic poisons threaten paralysis of important nervous centers.

But there are other ways of controlling vascular excitement than the use of the special sedatives,—means which are sometimes more prompt and efficacious. The hot

pack, or, if the patient possess a vigorous constitution, the cold pack, or bath, or the spirit vapor bath, may accomplish more in a few minutes than the sedatives can, safely, in as many days. These means will often serve to so thoroughly arrest the onset of a severe attack of fever, as to leave but moderate after effects, and enable the practitioner to control the remaining disturbances with little difficulty.

The effect of these remedies is not specifically upon the vasomotor centers; surface evaporation tends to refrigeration, and the moist condition of the skin induced by such treatment must favor this action; but doubtless the principal results are derived from the derivative influence of powerful determination to the superficial capillaries, thus diverting excitement from the vascular nervous centers, while the same means encourage active removal of the disease-producing element, through the cutaneous vessels.

The feeble circulation may depend upon heart failure, upon arterial lesion, upon want of capillary activity, or imperfect enervation of the vascular system. In acute phases, the capillaries are usually at fault; here minute doses of belladonna, liberal doses of capsicum, or the alcohol vapor bath, singly or combined, as indicated, usually serve the desired purpose. Venous fullness may call for hamamelis, carduus marianus, or podophyllin.

THE PULMONARY CIRCULATION.

The pulmonary circulation serves to distribute the venous blood of the general circulation, which has been returned to the heart by the right auricle, to the pulmonary mucous membrane, through which the interchange of gases between the blood and inspired air takes place.

The pulmonary artery conveys the venous blood through its bifurcations, which accompany the bronchial tubes and which ramify in capillaries upon the walls and

septa of the air cells, and upon the walls of the intercellular passages, from the right ventricle of the heart, which contracts and relaxes synchronously with the left ventricle. These capillaries are gathered up after distribution and united, finally, to form four veins,—the pulmonary, which return the newly oxidized blood to the heart by the left auricle. The constant filling of this cavity is requisite to compensation between this and the general circulation.

With regular and free supply of atmospheric air to the respiratory mucous membrane, and even and free distribution of blood to this part, and free exit through the heart into the general circulation, the offices of these organs and systems are carried on without commotion or friction; but a disturbance of the action of the heart, obstruction to the passage of blood through the pulmonary capillaries, or to the ready onward flow into the aorta, gives rise, at once, to imperfect oxygenation, disturbed respiration—in fact, disturbance of all the fluids of the body.

The function of the pulmonary circulation is the separating of oxygen from the respired air, and its delivery to the general circulation through the left auricle, as well as the elimination of carbon dioxide, which unless removed promptly, soon becomes powerfully depressing to vital activities. The therapist recognizes the importance of the pulmonary processes, and seeks to maintain them in the highest state of perfection, by every possible means.

In therapeutic application, we find a number of directions in which to aim our resources. Inflammatory states of the lungs, whether of the parenchyma or lining membrane, must be reached largely through the general circulation, and by such means as control cardiac and arterial excitement in other portions of the body. It must be

recollected that the general circulation supplies the tissues of the lungs, through the bronchial arteries, with blood, which is returned to the general venous circulation by way of the vena azygos and superior intercostal vein.

The sedatives, then, are applicable here, though they do not probably directly impress the pulmonary circulation, but instead exert their influence upon the vascular supply from the aorta.

By such means we seek to preserve the integrity of the pulmonary tissues—prevent engorgement, thus preserving open passages for the entrance of air to an unobstructed respiratory membrane, and, at the same time, preventing encroachment upon space devoted to the capillaries of the pulmonary circulation.

A few remedies manifest a marked predilection for the parenchyma of the lungs. One of these is *asclepias tuberosa*, which is one of the most reliable agents known in interstitial pneumonia. *Veratrum*, a more universally known agent, also is of great value, until the period of exudation arrives, when it should be abandoned for potassium chloride, which exerts a powerful influence toward restoration in such cases, by aiding in the successful removal of the exudates by absorption.

The integrity of the respiratory membrane, is of great importance. Delicate and unobstructed capillary walls are essential to proper interchange of gases. Indurations and other pathological changes are to be averted as far as possible by the use of such remedies as tend to encourage the plastic power of this part in its different localities.

The respiratory mucous membrane manifests affinities for various remedies in different portions, which affinities may be found of use in inflammatory conditions manifesting tendency to chronicity. For example, the Schneiderian membrane may be influenced by atropia, potassium iodide

or bichromate, or sambucus, etc. The larynx manifests affinities for aconite, arum, collinsonia, causticum, lachesis, and potassium bichromate; the trachea for nitrate of sanguinarina and sticta pulmonaria; the smaller bronchi for tartar emetic, ipecac, lobelia, and myosotis. The entire pulmonary mucous membrane is promptly influenced by calcarea carb., when its nutrition is at fault.

We directly influence the pulmonary circulation through cardiac remedies; indeed, the functions of the heart and pulmonary circulation are so intimately related that their therapeutics can hardly be separated. Remedies then which strengthen and accelerate cardiac action add to the activity of the blood in the pulmonary vessels, while those which sedate and steady cardiac function, produce a similar effect upon this system.

OXYGEN ARTIFICIALLY SUPPLIED.

Oxygen, in its influence upon the removal of worn-out material from the system, is far-reaching. Thoroughly oxidized waste products are readily removed by the emunctories with little tax upon their powers, but material not perfectly incinerated, may cause such serious difficulty as to impair the structure of the kidneys and other emunctory organs.

When the offices of the pulmonary circulation are imperfectly performed, it may be found of service to supply the element, oxygen, by artificial means. This has been practiced successfully by isolated practitioners, though not always discriminately, perhaps, for a long time, and the profession generally are forming more favorable opinions of this resource, as medicine progresses.

A few quotations from recent issues of the *California Medical Journal* will serve to illustrate:—

“Dr. J. H. Kellogg found oxygen gas injected into the lower bowel to act promptly in converting the dark venous blood of the portal capillaries into bright arterial

blood under vivisection, practised upon the guinea-pig and other lower animals.

He also found that a patient presenting uremic symptoms, viz., muddy skin, dingy sclerotics, coated tongue, brassy taste in the mouth, and persistent and distressing headache, while analysis disclosed an excessive amount of uric acid in the urine, improved promptly upon the daily use of two liters of oxygen per rectum for three days. At this time the excess of uric acid had entirely disappeared from the urine. The same author reports favorable results from this treatment in phthisis.

"Grestwell treated nineteen severe cases of scarlatina with inhalations of oxygen gas, and the administration of oxygen water internally. The latter was taken gratefully by the patient, as it diminished the thirst and removed the nausea so often met with during the course of scarlatinal nephritis. By carrying a larger quantity of fluid to the kidneys it aided these organs in the throwing off of the epithelia clogging up the tubules, and also in the excretion of the specific virus. The inhalations were practiced every two hours or every hour or half hour, according to the urgency of the case. About one-fourth of one cubic foot was inhaled at a sitting. In every case it removed the albuminuria. Convalescence was short and satisfactory."

"Rehn, of Frankfort, has made use of inhalation of oxygen in a number of cases. A girl of twenty-one years, who had been sick one year, and under good medical service, was suffering from what was diagnosed as leucæmia. She had total loss of appetite, great debility, and could not walk. The anæmia was of a high grade. She had enlargement of the spleen and liver; there was moderate œdema of the lower extremities. A microscopical examination of the blood showed a great increase in the number of white blood corpuscles. Inhalations of oxygen, fifteen liters daily, were ordered, and their use persisted in for one

year, so that the girl is now as healthy as one could wish."

The peroxide of hydrogen may sometimes serve as a valuable medicament, for reason of the oxygen it contains. Even in threatened asphyxia in pulmonary congestion, this agent has been known to sustain life and ameliorate, meantime, a very unpleasant train of symptoms, until the severe local congestion had subsided, and the supply of oxygen could be obtained in sufficient quantity in the natural way.

THE PORTAL CIRCULATION.

This portion of the sanguineous system is peculiar in its anatomy in that it consists of a double distribution of capillaries after leaving the arteries before entering the general venous circulation, and in its offices, that it receives the food pabulum except what is absorbed by the lacteals, and exerts upon it the primary impressions which fit it for distribution by the general circulation as fuel and tissue-building material.

The celiac axis and the superior and inferior mesenteric arteries furnish the blood from the abdominal aorta, which is distributed to the stomach, pancreas, spleen, and intestines. The capillaries from this distribution to the alimentary canal serve as means of reception of the nutriment which has been put in condition by action of the digestive solvents, for ready absorption.

These capillaries are gathered into venous channels which unite to form one large trunk, the portal vein, which enters the liver and distributes capillaries, these uniting within the hepatic organ with the capillaries of the hepatic artery, one of the branches of the celiac axis.

The branches of the portal vein, hepatic artery, and biliary duct, keep company in their distribution through the liver, their capillaries forming vascular tufts of intimate association, the hepatic cells lying among the

masses performing their important functions, the hepatic veins and their branches being common venous channels for the exit of the remodeled portal blood into the vena cava.

With normal activity of the hepatic cells, the secretion of bile goes on in such a manner as to conform with healthy processes. But with torpor of the biliary function, or obstruction to the free exit of the bile from the ducts after its secretion, this fluid finds its way through the capillaries of the hepatic vein into the general circulation, and symptoms of jaundice appear.

"Bile, as such, is not pre-formed in the blood. It is formed by the hepatic cells, although some of the material may be brought to them almost in condition for immediate secretion. When it is, however, prevented by an obstruction of some kind from escaping into the intestines (as by the passage of a gall-stone along the hepatic duct), it is absorbed in great excess into the blood, and circulating with it, gives rise to the well-known phenomena of jaundice. This is explained by the fact that the pressure of secretion in the ducts is very low, and if it exceed three-fifths inch of mercury the secretion ceases to be poured out, and if the opposing force be increased, the bile finds its way out into the blood."—*Kirke*.

Evidently the principles of selection demand discrimination in the matter of the bile-secreting function, if we are to expect success to follow our efforts for relieving different cases of jaundice. It is not enough to prescribe a remedy here possessing an affinity for the liver. The remedy must exert an influence to correspond with the part effected. The sluggishly operating biliary process may be encouraged, in the absence of obstruction, by *chionanthus*, or a similarly acting remedy, but if obstruction exists, the character of the lesion must be determined and rationally prescribed for. Obstruction by gall-stones, in

the absence of more specific means, may be relieved by olive oil, but if tumefaction of the lining membrane of the biliary ducts from catarrhal inflammation be present, cheledonium will be a more appropriate remedy; or if the obstruction be due to pressure from general congestion of the abdominal blood-vessels, we will expect benefit from polymnia, ceanothus, carduus, or grindelia squarrosa; or nux or podophyllin, if the fault be due to fullness of the hepatic capillaries.

Cholagogues deserve no consideration in a work on dynamical therapeutics; agents which stimulate the flow of bile appreciably, must act as disturbers, not only of the biliary function, but of every associated process. Restoration of the bile-secreting function, can be brought about more satisfactorily and permanently by agents not so liable to disturb the general functional relationship prevailing.

The glycogenic function of the liver is an important one, serious consequences being the result of its permanent disarrangement.

The glucose formed from the saccharine and amylaceous portions of the food is converted into glycogen, or liver starch, and stored away in the substance of the gland as a means of supply for the needs of the body when sugar is demanded; this is reconverted into glucose by the hepatic functions when required. Disturbance of this function interferes with such elaboration, and permits the raw product from the portal vein to traverse the hepatic circulation without change, to serve as an irritating element in the general circulation, or else the transformation by the liver goes on at an excessive rate, and the lungs, which sustain a certain relationship by the combustion of sugar in the pulmonary circulation, as well as the kidneys, upon which devolve the duty of removing the excess, must suffer.

Therapeutically, we are at a loss to know whether remedies relieve such disturbance through specific influence upon the liver, upon the vaso-motor centers of the organ, or through their influence upon the respiratory centers by encouraging the combustion of sugar in the pulmonary circulation. But we know, empirically, that syzygium relieves such disturbance in some cases, at least, and lessens the amount of sugar present in diabetic urine. Probably to effect a cure its use must be begun early, but the success already met with will encourage the belief that diabetes may yet be classed among the curable complaints, and thus stimulate further research.

Nitrate of uranium has been accredited with the cure of numerous cases of diabetes mellitus by physicians of our own school, as well as those of homeopathic and allopathic persuasion, and we should not forget two so important remedies as this and syzygium when the glycogenic function of the liver is at fault.

The action of the liver upon the products of albuminous food conveyed to it by the portal vein is a function of the greatest importance. The peptones of the portal blood must be submitted to the action of the liver cells before their presence can be tolerated in the general circulation. It has been found that such matter injected into the jugular vein speedily appears in the urine, demonstrating its rejection as blood or tissue-making pabulum unless the liver has exerted an influence upon it.

Excessive indulgence in lean meats is usually the cause of disarrangement of this function, and knowledge of the cause would suggest an important element of cure,—avoidance of animal food.

But the tired liver may be invigorated in this case by the proper remedy, the effects being observable, not so much perhaps in local changes, as in the sense of relief experienced in the system generally.

In such a case the symptoms of general prostration are out of all proportion to the real amount of disease present. The patient is tired, so that the least exertion is dreaded, often drowsy, inclined to lethargic sleep in the day-time, while restless wakefulness harasses his mid-night hours. The appetite meanwhile is often unnaturally voracious.

Abstinence from animal food and a spare diet generally, will assist therapeutic application here. The specific remedy is *mercurius dulcis* in the second or third decimal trituration, in small doses, three or four times daily. Nothing more magical was ever known in medicine than the effect of this remedy, properly adapted. The value of the hepatic influence of hydrochloric acid has long been recognized; in small doses, well diluted, it serves a valuable purpose here.

The uric acid habit—*lithæmia*, as well, probably, as *oxaluria*—is referable to imperfect hepatic action upon certain elements of the portal blood; though without doubt the primary fault is lack of thorough oxidation of the nitrogenous elements of the tissues undergoing retrograde metamorphosis, in addition to faulty material which has passed the portal circulation without receiving due elaboration.

If one of the functions of the portal circulation is the conversion of waste proteid material into urea, it is important in all cases of chronic disease to inquire into the amount of work being thrown on this part. The habitual presence of excess of lithic acid in the urine indicates faulty action here, and demands that a better preparation of the general current distributed to the portal circulation shall be made.

Liquor potassæ, benzoic acid, and benzoate of ammonia, may then become, indirectly, important remedies for disturbed states of this circulation by aiding the kidneys to

carry off an excess of an element which taxes the powers of the structures among the hepatic capillaries. Oxygen administered in different ways may also be of highest service in assisting in a more complete conversion of proteid products into normal excrementitious material.

BLOOD PRESSURE—ARTERIAL TENSION.

"The arteries in the normal condition are continually on the stretch during life, and in consequence of the injection of more blood at each systole of the ventricle into the elastic aorta, this stretched condition is exaggerated each time the ventricle empties itself. The condition of the arteries is due to the pressure of blood within them, because of the resistance presented by the smaller arteries and capillaries (peripheral resistance) to the emptying of the arterial system in the intervals between the contractions of the ventricle, and is called the condition of *arterial tension*."—*Kirke*.

It has been estimated that the arterial tension in the aorta of the human adult is equal to about four and one-fourth pounds avoirdupois. As the distance from the heart increases there is a corresponding decrease in the pressure, the tension in the radial artery, for instance, at the wrist being only about four drachms. Thus the blood pressure is greatest in the left ventricle and decreases towards the capillaries. In the capillaries, arterial tension ceases to be the principle motor, though it probably serves as a *vis a tergo* in forwarding the blood on its rounds, though the attraction of the various elements for the tissues is here undoubtedly more of a motor force.

A relative compensation between arterial tension and vascular integrity, is essential to the continuation of health and life. A common cause of disease and sudden death is rupture of an artery through undue intravascular pressure. Certain conditions conspire to a large amount of blood in the vascular system; here the strain is

principally upon the arteries, as the capacity of both capillaries and venous system greatly exceeds that of these vessels.

Certain individuals incline to plethora—fullness of blood, and the arterial tension may be so great that the strain finally ruptures an artery in some unfortified situation, as in the delicate structures of the brain, for instance, and sudden death or a confirmed hemiplegia is the result.

Age is one of the predisposing causes of this condition, degeneration of the arterial coats often being one of the results of senility; but certain climates may predispose to such accidents, in persons of middle and even early life.

On the Pacific Coast, we find deaths from arterial rupture—as well as hemiplegia—of quite frequent occurrence, among persons who have not reached the period of bodily decay, and the causation must be attributed more to undue arterial tension, usually, than to lack of integrity upon the part of the tissues of the arterial walls.

Plethora is due here, probably, to our climatic peculiarities. The dampness of the atmosphere reduces the surface evaporation to a minimum quantity, and the cool, bracing air stimulates indulgence in a liberal diet; consequently the blood is freely supplied with pabulum and the nutritious elements are rapidly manufactured into body fluids until the vascular system is filled to repletion. Fulness of tissue,—plumpness of form—of the average inhabitant of the Pacific Coast is a subject of common remark, and a no less noticeable peculiarity, to the medical observer, is the frequent occurrence of apoplexy.

Probably, also, we may justly ascribe many of our common nervous diseases, as insanity and insomnia, to this cause,—vascular pressure in the cerebral arteries, continued for a long time. finally giving rise to pronounced

functional disturbance, as manifested by the irritability of abnormal wakefulness, or that of mental aberration.

And we may observe other disturbances, due, without doubt, to this influence. Chronic congestive conditions—as well as acute—are more aggravated, painful, and stubborn, where there is excessive arterial tension; and therapeutic measures may be materially assisted by temporary removal from the influences which encourage it, into surroundings which tend to neutralize such a state.

In such climate as that of Arizona, where the air is dry and warm, and surface evaporation quickly robs the blood-vessels of their superfluous fluids, sparseness of form is the tendency. Dr. Munk asserts that the climate of that country is a positive anti-fat remedy; probably this is so because the physical conditions tend to rapid removal of the fluids of the body. Here we would expect arterial tension to be at a minimum and apoplectic affections of rare occurrence.

But there are sections nearer at hand than Arizona which offer nearly as favorable advantages for the purpose desired. The interior of California affords many places which may supply everything necessary, in a warm, dry atmosphere.

On the other hand, lack of arterial tension may give rise to anæmic conditions which ought to be benefited by removal into such a climate as that of our coast. Here the natural advantages encourage blood-making, increase arterial tension and the supply of nutritious fluids to every part of the body, and thus afford the very means to successfully abet the efforts of medicine in accomplishing restoration.

The therapeutics of arterial tension may consist of evacuants, by which the superfluous fluids are removed from the body, through the skin and kidneys. Latter-day therapists might suggest nitrite of amyl, nitro-

glycerine, and other depresso-motors here, but it is not probable that any remedy can long counteract the constant influence of climatic tendencies.

A change of climate, for a time, may serve a better purpose. Persons of plethoric habit or other apoplectic tendency would do well to abide in a region where the natural surroundings contribute to free cutaneous and pulmonary evaporation, as this must act as a safety-valve in relieving undue arterial tension, by lessening the proportion of circulating fluids.

Venesection here, severely as it has been denounced by Eclectics, would not seem so irrational after all, when an apoplectic seizure indicated arterial rupture, with possibility of extension of the lesion; true, the best portion of the blood may be abstracted, but in such patients, usually, the manufacture of new material would seem to be one of the most readily accomplished functions.

THE PULSE.

The pulse affords an index to the selection of remedies, in quite a wide range of acute diseases. In chronic ailments, also, it should be taken into consideration in making up the general estimate of therapeutic indications.

The condition of the heart may be pretty well determined by the practiced touch, from the pulse, but as auscultation is a more accurate method of detecting cardiac alterations, examination of the radial impulse is not so important here, as in estimating the state of the vaso-motor centers, the general tone of the circulatory system, the freedom from, or presence of, obstruction to the vascular stream, and character of impression made by the disturbing element, upon the general nervous system.

Arbitrary propositions have been found more satisfactory than the most labored deductions in adapting remedies to the various conditions of the circulation as indicated by the pulse; for example:—

The rapid *bounding* pulse denotes arterial relaxation from temporary suspension of force in the vaso-motor centers, and is usually present in *sthenic* conditions, the disturbing cause having been but recently developed. It either subsides to the normal condition within a limited period, or merges, in continued febrile states, into a more feeble impulse, indicating debility. Gelsemium is the specific remedy here.

The rapid, *hard* pulse denotes *sthenia* with obstruction to some important avenue in the circulation, as of the pulmonary vessels, the obstruction being probably inflammatory in character. Here *jaborandi* or *veratrum* are especially indicated.

The full, hard pulse with *dry skin*, and severe localized pain, is an indication for *jaborandi*, in full doses.

The rapid, *small* pulse indicates excitation of the vaso-motor centers without corresponding reactive power on the part of the heart and blood-vessels. It is the pulse of *asthenic* fevers and inflammatory conditions in subjects lacking robustitude. *Aconite* is the leading specific remedy here, if the dose be not too large.

The rapid, small pulse, with erratic, shifting pain, calls for *antipyrin*, in *moderate* doses.

The feeble, *compressible* pulse, with coldness of the extremities, dizziness, and pallor of the skin, denotes feeble capillary circulation, and the need of *belladonna* or *capsicum*. There may, or may not, be dilatation of the pupils.

The rapid, *wiry* pulse denotes unusual disturbance of the cerebro-spinal capillaries, and is often marked by restlessness and delirium, with bright eyes and contracted pupils. Here *rhus tox.* is the appropriate remedy.

The excessively rapid, *fluttering* pulse indicates a tremulous heart action, with impending paralysis of the cardiac ganglia. It occurs in febrile conditions of the aged, and from the markedly prostrating effects of such poisons as

those of diphtheria and scarlatina. Lachesis is the remedy for such indications.

The feeble, *labored* pulse, with sighing respiration, indicates heart failure and demands nitro-glycerine.

When the pulse denotes a chronically feeble heart action, such agents as *cereus Bonplandii*, *digitalis*, and *strophanthus*, should be thought of; but this leads us to the consideration of cardiac therapeutics, which had best be examined separately.

Some writers enter into still further detail, in respect to therapeutic indications furnished by the pulse, but too much detail would be liable to impair the usefulness of this valuable diagnostic resource.

An old school writer, Dr. W. R. Lowman (*Medical Bulletin*) offers the following, on pulse indications of pathological conditions:—

“Study pulse carefully. May range normally from 50 to 100. Male usually 72 per minute; female, 76. Increase per 1° rise temp., 10 beats per minute. The pulse may be quick in stroke yet in beats slow or infrequent; full, round, and large; empty, small, or thread-like; strong or weak in impulse; hard, whip-cord, or soft, compressible; wiry, like wire striking the finger; irregular, fast and slow alternately; intermittent, one or more beats lost; dicrotic, double-stroked; asynchronous.

“Normal pulse in sphygmographic curves.

“Full and strong inflammatory fevers and hypertrophy of heart.

“Slow, hard, and strong, pulse of laborer, boxer, etc.

“Slow, strained, and strong pulse of meningeal derangement, but not a sign in the powerful.

“Frequent in pregnancy.

“Slow few hours after labor.

“Weak and slow in dilatation of heart.

“Very frequent in some specific fevers; sometimes from

weakness, as in diphtheria, therefore stimulants will often bring down.

“Quick and sometimes hard and sharp in abdominal or rheumatic inflammation.

“Frequent, hard, sharp, and wiry in gastric or inflammation of any organ below the diaphragm.

“Small, soft, and quick in aortic stenosis or dilatation of veins.

“Small and slow, extreme debility.

“Irregular, and often quick, later stages pericarditis.

“Irregular, often only sign of endocarditis.

“Intermittent, angina pectoris, cardiac, and brain diseases, but sometimes normal.

“Dicrotic, grave, approaching dissolution.

“Small and irregular, mitral affections.

“High and fast, aortic insufficiency.

“Tardy, senile.

“Asynchronous pulses from asynchronous contraction of sides of heart, double sound, but no double wave for each, symmetrical. Unilateral is diagnostic of aneurism.”

THE TEMPERATURE.

The temperature of the body is an important consideration in questions of health and disease. So nicely are the compensating forces of the organism balanced that it is impossible for a marked departure from the normal standard of 98.6° Fahr. to occur without serious disturbance of the vital processes resulting.

In earlier time the temperature was estimated roughly from the impression conveyed to the touch of the observer by the heat of the surface, but this estimate was of little value in determining the significance of an elevated or depressed temperature, and it failed entirely in enabling the observer to arrive at any data of reliability. Now the exact temperature is ascertained by an instrument which leaves all guess-work out of the question and enables one

to form a very intelligent idea of the character and probable results of the condition, in many diseased states.

In most cases of disease if the thermometer indicates any departure from the normal temperature it will be in an upward direction. Even though the surface or extremities may seem cold to the patient and observer, and in fact may be below normal heat, owing to absence of the usual amount of blood in the superficial capillaries, the thermometer may register two or three degree's elevation in the cavities where the blood is circulating more freely. Sometimes, however, during a chill, thermometry has demonstrated beyond cavil a lowering of the normal temperature in the cavities usually tested. Whether the actual temperature of the blood is lowered may nevertheless be considered a question, as the internal organs may even then be subject to an increased caloric. During convalescence from continued fevers or other protracted illness the temperature may be slightly depressed for some time, until the debilitated vital forces recover wonted vigor.

In febrile states there may usually be a rough estimate made between the elevation in degrees of temperature above normal and in the increased frequency of the pulse, each degree of elevation corresponding to ten pulse-beats per minute. For example, with the normal pulse at sixty-five per minute, we would expect the temperature to be 99.6° if the pulse rate were seventy-five, 100.6° at eighty-five, 101.6° at ninety-five, and so on. This, however, is not a rule to be depended upon, as the nervous susceptibilities of patients vary so much that an excited heart-beat might result from slight provoking causes in one, while in another the same amount of disturbance would hardly be appreciated. Still it is a proposition not to be disputed that increase of temperature is attended by increased action of the heart; in fact, the accelerated circulation with increased oxidation of tissue may be fairly regarded as

the cause of the elevated temperature, the excited circulation being the result of irritation of the sympathetic nerve centers, from which spring the regulating fibers of the circulatory apparatus.

An elevation of the temperature above the normal standard, indicates an abnormal rapidity in the oxidizing processes in the tissues—a condition that must be attended by wasting of flesh and loss of strength, the danger of final exhaustion being in proportion to the amount of elevation and persistence of the condition; a remitting, elevated temperature is not so dangerous as a constant one, as during the remissions the vital powers are somewhat recuperated.

Means which lower the temperature rapidly are not usually desirable, as they must prove depressing to the entire vital forces. Those which act mildly and bring about a slowing of the oxidizing processes gradually are to be preferred, usually, for they leave behind a salutary condition of the general system. The special sedatives, therefore, are the most desirable means of accomplishing this purpose, for as there seems an intimate relationship between bodily temperature and pulse rate, when abnormal elevation occurs, a moderation of the excitement of the circulation promises a lowering of the heat.

But there are other means which sometimes seem to act better than the sedatives. In typhoid conditions where septic states of the blood prevail, the sedatives seem sometimes to have lost their power of impressing the vasomotor centers, and we find it necessary to resort to more heroic means and, perhaps, more empirical ones. Sometimes the *hot pack* properly applied succeeds here admirably in reducing a temperature of 107° or more Fahr. to nearly the normal rate, and thus in a short time almost aborts a disease which might otherwise prove fatal.

Dr. Lyman Watkins (*California Medical Journal*) reports

success in a severe and fatal endemic of typhoid fever from the use of heroic doses of quinine—30 to 40 grains at a time, or within a few hours, lowering a temperature as high, in some cases, as 107° to near the normal rate, in a short time. This treatment was found superior to the use of the special sedatives, no mortality following after the use of the large doses of quinine was begun.

A knowledge of the state of the temperature is sometimes important, that the proper time may be selected for the exhibition of remedies. In a remittent fever if the remission be short and we desire to make avail of it for the administration of an anti-periodic, we may learn when it has begun by the thermometer before the ordinary symptoms may be detected. In typhoid fever, scarlatina, and other fevers, where powerful agents are employed to depress the temperature,—and the exhibition of such means may sometimes be all-important, the thermometer enables us to tell just when the temperature has arrived at that point where the remedy must be discontinued for fear of too great depression; large doses of quinine, anti-pyrin, jaborandi, and kindred agents should not be administered without the guidance of clinical thermometry to point out the time for discontinuance, lest the depression of temperature be carried beyond the period of recuperation.

Knowledge of a depressed state of temperature would prompt the application of artificial heat, and the internal use of such agents as capsicum, myrrh, and possibly brandy and ether; where the depression was more chronic in character, Faradism, massage, pure air, and other hygienic measures should take the place of artificial stimulants. Protracted depression due to capillary congestion requires the specific agent, belladonna.

THE ALIMENTARY CANAL.

The functions of the alimentary canal, though somewhat

complicated, look to the one end—the supplying of nutriment in absorbable condition, to the blood-vessels and lacteals.

The complication of function, however, is due to the character of food required—the variety of substances demanding numerous solvents and digestive cavities for their complete preparation for appropriation. In the mouth, the masticatory process is supplemented by the action of the saliva which, in addition to the specific property of converting starch into sugar, acts as a mechanical element in lubricating the bolus for ready passage along the œsophagus during the act of deglutition.

The œsophagus serves as a conduit to the stomach, where digestive proceedings assume a new phase, the mucous membrane of this cavity providing a fluid of acid reaction for the solution, exclusively, of albuminous food (proteids).

Passing the pyloric orifice and entering the duodenum the aliment becomes subjected to a variety of digestive solvents, which, however, combined, afford an alkaline reaction. Here the digestion of starch and albumen already begun in mouth and stomach is furthered to completion, and in addition the fats thus far unaffected are broken up so minutely as to be prepared for reception by the absorbents of the lacteals.

Here all the digestive solvents are combined,—saliva, gastric juice, pancreatic secretion, bile and intestinal fluid,—to carry out the complete preparation of the aliment for reception by the portal capillaries and lacteal absorbents.

But the requirements of good digestion do not end here. A free circulation in the abdominal blood-vessels is essential to a proper elaboration of the digestive juices. Secretion cannot go on well if the vessels which furnish the elements are in a disturbed state. The proportion of

aliment requisite to the needs of the economy must be appropriate, for if in excess, the hepatic functions become affected, and a backward influence is exerted upon the abdominal capillaries to disturb, not only the separation of the digestive solvents, but, likely, even the normal peristaltic action. The *debris* of ingested food must be moved along and evacuated in order to preserve the proper relations and equilibrium between all the functions of digestion.

Impaction of the lower bowel is a common and powerful factor in disturbance of the alimentary functions,—a condition commonly recognized but most irrationally treated. The sympathy of all parts of the alimentary canal for each other, accounts for many cases of indigestion, mal-nutrition, and reflected nervous ailments arising from impaction of this passage, below the point where the active processes of digestion cease. A habitually impacted colon may thus become the cause of a thousand sympathetic and reflected ills, of which indigestion and neurosis constitute the principal symptoms.

Rectal diseases, then, and torpid states of the lower bowel, present claims of fully as great import in the management of alimentary disturbances as the therapeutics of the upper portion of the canal. Possibly medicine may be the only requirement here, but judiciously adapted surgical knowledge is important, that a proper preservation of the alimentary functions may be accomplished.

The physician must not forget the bearing which age exerts upon the functions of digestion. Nature provides the infant with only the capacity of digesting animal food, the salivary glands and pancreas lack the power of converting starch into sugar, and this substance when taken by such subject undergoes only those changes which tend to produce disturbance of digestive action. The lesson should prompt the rejection of such foods as a primary

measure, if remedies are to be expected to bring about a desired result, when infantile intestinal affections are prescribed for.

In advanced life the general atrophy which affects the individual extends to the walls of the alimentary canal, as well, and a dietary entailing as little muscular and glandular effort upon the part of the structures here as possible should be provided, if the full effect of therapeutic agents is to be expected.

The common plan of medicating the alimentary canal presents many pernicious features. Cathartics to relieve constipation, astringents to arrest diarrhea, preparations of pepsin and pancreatin for indigestion, bismuth, perhaps, for irritated states of the gastro-intestinal mucous membrane, and opiates for pain, when this is a feature, comprise the bulk of treatment prescribed by the ordinary practitioner.

Cathartics unload the lower bowel, but in doing so they disturb, more or less, the important functions carried on in the stomach and small intestine, and they furthermore, when habitually employed, predispose the mucous membrane to indurations and epithelial changes which not unfrequently terminate in cancerous growth.

Astringents are rarely of value in gastro-intestinal affections; they may occasionally afford satisfaction in the treatment of watery evacuations from the bowels, but usually the intestinal capillaries can be more promptly influenced by agents which specifically impress them in dynamical doses.

The practice of supplementing the action of the glandular structures which secrete the digestive ferments with artificial supply, lacks reason. To lapse into uselessness is not the part that any portion of the body can be expected to take. The pepsin delusion has many followers; possibly exceptional cases are benefited by

its administration, but as many are aggravated as are bettered. Indigestion cannot be favored materially by the artificial supplying of digestive ferments when the apparatus which ought to secrete them is in an abnormal condition.

Pepsin and kindred preparations, when genuine as to quality, may aggravate gastro-intestinal difficulties—though doubtless they sometimes prove beneficial—while often the negative results obtained depend upon the complete worthlessness of the preparation; an infusion of rennet is more reliable than the majority of pepsin products offered in the market.

Dynamical therapeutics, as applied to the alimentary canal, may be separated into three divisions: (1) The therapeutics of diet; (2) the therapeutics of the sanguineous circulation of the part; and (3) those agents which specifically influence special portions of the track through tissue affinity.

The therapeutics of diet is a subject of such importance as to demand a separate and careful study, and will only be referred to here.

The therapeutics of the circulation demand consideration of two classes of remedies; those which influence the general circulation—for the parts above the stomach are supplied from this source—and those which are especially adapted to the portal system. This subject, which has already been studied, demands further investigation; for when its possibilities are completely understood we will have brought the problem of derangements of the alimentary canal much nearer solution.

The third class of therapeutics here is that which includes those agents which by their tissue affinity specifically influence different portions of the apparatus; for instance, beginning with the mouth, we have iris, jaborandi, phytolacca, and mercurius, for the mucous membrane

and salivary glands; penthorum and phytolacca, for the pharynx; lachesis, naja, veratrum, etc., for the œsophagus; arsenic, boldo, lobelia, nux vomica, potassium bichromate, and many others, for the stomach; colocynth, epilobium, ipecac, baptisia, etc., for the small intestine; iris versicolor, iodine, and mercurius, for the pancreas; potassium bichromate, mercurius corrosivus, and others, for the colon; and æsculus, collinsonia, etc., for the rectum.

These specifically influence their respective portions, improving nutrition, encouraging normal secretion, muscular power, and recuperative energy, when disease is present, relieving irritation, and thus conducing to healthy conditions.

In addition to such agents, properly selected, local influences may often be of service, and the subnitrate of bismuth especially may prove of signal value for its soothing effect on the gastro-intestinal mucous membrane.

In the absence of proper digestive power the prepared foods are preferable to pepsin or other digestive ferments, as such debility is hardly ever confined to the peptic or pancreatic glands alone, but is shared by other parts whose integrity of structure and action is equally important.

Proper operative procedures are also of prime importance in the management of many cases of alimentary derangement. An irritable sphincter may counter-balance all the advantage to be derived from medicines, and may require surgical interference, in order to relieve the troublesome reflexes arising, before the expected therapeutic effect can follow.

Fecal impaction, so sure to result from this condition, may require this as well, and the procedure may need be supplemented by the use of galvanism, in order to arouse a part long subject to torpor, to normal activity, and insure the regular movement so essential to health.

Rectal diseases thus constitute an important branch of practical medicine, and demand the careful consideration, not of the specialist alone, but of the general practitioner, if he is to be successful in his calling.

THE TONGUE.

The tongue serves as a valuable guide in the selection of a number of remedies, which could hardly be dispensed with in the treatment of disease.

Being a portion of the digestive tract, it seems to possess, in its shape, color, and other appearances, in many instances, an index of the condition of the stomach and its associate viscera. The circulation here, its character, the condition of the blood, as well as the state of the nervous supply, may often be tolerably well determined by inspection of the tongue, and the appropriate remedy also selected.

Thus, torpid conditions of the stomach, liver, and associate organs concerned in digestion, are reflected by the tongue, which is full, broad, and flabby, and is protruded slowly and awkwardly. Morbid accumulation in the stomach associated with this condition is manifested by a deposit upon the base of the organ. Irritation of the gastro-intestinal surfaces is manifested by a narrow, pointed tongue, the tip of which is usually reddened; with this condition is often associated tremulousness upon protrusion, indicating a high state of nervous tension.

The condition of the blood as regards tendency to zymotic changes, is also most readily indicated by the tongue, the pallid mucous membrane and white coating indicating excessive acidity of the alimentary canal and lack of soda salts in the plasma; this can be demonstrated by testing with litmus paper. On the other hand, the opposite condition—lack of acids in the alimentary canal, and probably excess of the salts of sodium in the blood—is

indicated by abnormally dark red color of the mucous membrane. This indication, however, must not be confounded with the bluish or purplish discoloration consequent upon a cyanotic state; here the means best adapted to the furthering of oxygenation of the blood should be selected, as most appropriate.

The coating which appears on the tongue—sometimes in health as well as in disease—has been shown by Dr. W. H. Dickinson, through microscopical examination, in a large number of cases of both healthy and diseased subjects, to consist of horny epithelium, and the various grades of accumulation to consist in its increase. Incidentally connected with this, may be found certain parasites, though their presence might exist in a state of health.

Want of attrition, as in abstinence from food, may favor such accumulation when disease is present, but it seems indisputable that it often depends upon depravation of the fluids usually febrile or inflammatory in character.

The *dry* tongue may be the result of the passage of air over the surface of the organ, as when one sleeps with the mouth open, or it may result from the use of opiates which temporarily arrest the secretion of the salivary glands, but when persistent the symptom is due to want of salivary secretion from constitutional disturbance; though then the patient is liable to aggravate the condition by mouth breathing.

In diabetes and diarrhea, however, dehydration of the blood to an abnormal extent may account for a dryness of the tongue. In a peculiarly dry atmosphere that will favor rapid evaporation, the symptom may be common to diseases of mild type. In a moist climate, as of the Pacific Coast, the dry tongue is not a common symptom; even in serious forms of disease where great prostration

is present, it is remarkably rare, as compared with less humid sections.

As a rule, the dry tongue, under other circumstances than those already referred to, may be considered as an indication of marked prostration. "When the tongue is dry and bare," says Dickinson, "it is ill with the patient. He is not sure to die but likely to. If, as has been said, the tongues of dying men enforce attention, it must be often directed to this."

The coating of a dry tongue must sooner or later become brown and exfoliate, leaving the organ bare and slick. It is a process of denudation certain to follow from death of the epithelial covering consequent upon inability of the lingual capillaries to transmit nutrition to the desiccated epithelium, and destruction and separation must follow.

The application of remedies to conditions of disease, as indicated by the tongue, has been learned by empirical practice—by the plan of "cut and try," usually adopted when no well-defined method or principle of procedure is obvious. Such knowledge, however, is as valuable as any other, when proven, and considerable assistance in prescribing can be drawn from indications thus determined. For example:—

The *broad, flabby* tongue, with *heavily coated* base, accompanied by gaseous eructations and sense of heaviness in the epigastric region, indicates the need of an emetic.

The broad, flabby tongue, with *pallid* mucous membrane and *white* coating, indicates the need of a salt of sodium, the sulphite usually being preferable. This is pre-eminently the remedy, if the coating be *plastered—pasty*—in appearance. The pallidity of anæmia should not be confounded with that of this condition.

The *dark-red, slick* tongue—resembling *beef steak*—

indicates the need of hydrochloric acid; though other forms may answer, lemonade, lime-juice, and similar acids, being more acceptable and nearly as efficacious, in many instances.

The abnormally dark red tongue with *dirty, brown* coating indicates the need of sulphurous acid. When the brown covering is well-defined, and not due to staining by food or medicines—as may result from fruits, iron, etc.—this remedy will be found reliable in the absence of increased redness of the mucous membrane. The sulphurous acid tongue, when marked, is often associated with sordes on the teeth and lips.

The *narrow, elongated, pointed* tongue, with *reddened tip and edges*, indicates gastric irritation, and is usually attended by nausea and vomiting. When protruded tremulously, it calls for rhus tox; otherwise, ipecac, subnitrate of bismuth; or an infusion of the bark of the amygdalus persica (peach tree) may be preferable.

Prominence of the fungiform papillæ at the tip and edges gives us the “*strawberry tongue*” usually also narrow and elongated. This is generally observed in febrile conditions, being common in scarlatina, and not rare in some forms of continued fever. Rhus tox. affords satisfaction as a remedy in the majority of such cases.

The *contracted* tongue—short and narrow—with *dry, shriveled center*, denotes blood depravation, with profound vital prostration. It indicates the need of rhus tox., echinacea, or, if the case be *typhoid fever*, baptisia; if attended by convulsive tremors of the extremities—*subsultus tendinum*, potassium phos.

A noteworthy condition of the tongue is that which has been described as the “*map*” tongue, by some writers. The appearance of the organ is striking, but presents little therapeutic significance, as the condition is probably local, or at least of the character of a cutaneous eruption,

depending perhaps upon some disturbance of the trophic nervous supply.

Many of these indications have been taught by Scudder, and have been employed by physicians of our school, with the happiest results, for years. Other indications have been proposed, but I believe this is a subject which can be carried into so trifling detail as to be rendered embarrassing, and thus interfere with the real worth of such means of therapeutic adaptation. When we attempt too much, where there is so little opportunity of marked changes as the tongue affords, we must deal with whimsical symptoms which mean little or nothing, and are not seen alike by two observers.

But these are so plain that none will mistake them, and they cover about all the ground the subject will allow. When they are manifest, there is no uncertainty about the plan to pursue; with the tongue indication marked, the appropriate remedy should constitute the foundation of the treatment until a normal condition, so far as this symptom is concerned, has been reached.

We observe these indications most commonly in febrile states, but there are not a few chronic conditions where the tongue will afford the needed hint for the correct remedy.

I once cured a case of chronic ague of more than two years' standing, which had resisted all the antiperiodics of the three schools, with emetics administered twice a week for a month; the indication for such treatment was prominent, and the indicated remedy, an emetic, proved successful.

An obstinate case of dyspepsia, after being treated for years by different physicians and resisting my own efforts for a whole summer, yielded promptly upon the administration of the sulphite of sodium in appropriate doses. The indication was prominent from the start, but, like many another prescriber, I had too little faith in the

remedy in such a disease to give it a fair trial in the commencement of the treatment.

Dr. W. R. Lowman, already quoted (page 63), offers the following practical observations on tongue indications, which are worthy of notice, though they contain no reference to specific therapeutic adaptation.

"If of a smooth, pale, pinkish, moist, and elastic, resistive appearance all is well. As has been pointed out, if it is furred and of a dull, whitish hue, there is either in the organ itself "a congested or hyperacid condition" or asthenic condition of system with a local or other cause in proximity; but if redness, with fur, there is a hyperalkaline or inflammatory state."

"Fur indicates epithelialization, a hyperproduction, or non-removal by friction, as in fever. We have increased circulation and lack of attrition by want of appetite and consequent absence of mastication. Infants' tongues are white at the back part from lack of attrition.

White furred denotes non-attrition, oral inflammation, croup, pneumonia, measles, etc.

"Yellow furred indicates hepatic derangement with retention of bile, fevers, etc.

"Red, long, and pointed shows inflammation of stomach, bowels, etc., diarrhea, etc.

"Very red in scarlet fever (infant's strawberry), chronic diarrhea.

"Clean and slightly coated in yellow fever.

"Dry, cracked, scaly, and brown is seen in the latter stages of a long continued specific fever, like typhoid, or in rapid specific fever of high grade, as typhus.

"Ridges, fissures, or sulci characterize the hepatic disorders so common to the South and malarial regions.

"Cracked edges, derangement of kidney.

"Red, pointed, and dry denotes nerve irritation.

"Broad and porous denotes imperfect elimination and muscular weakness.

“Flabby and full denotes blood poverty and debility.

“Dry in high temperature, profuse diaphoresis, diarrhea or other exhausting discharges.

“Coated or yellow in cancer of stomach.

“Clean and reddish in ulcer of stomach.”

THE NERVOUS SYSTEM.

The functions of the nervous system may be stated to be the generation and conduction of vital impulses to different portions of the body, and reception, by certain centers, of influences from external impressions made upon the peripheral extremities of sensory branches. To these we must add a higher function, that of the generation of mental impressions, independently of the processes of animal life.

The anatomy of the nervous system consists of two classes of structure: (1) vesicular or generating structure, and (2) fibrous or conducting structure.

The vesicular structure makes up the principal bulk of the generating centers, as the brain, spinal centers, and ganglia of the sympathetic, though the nerve fibers penetrate them, to communicate with special cells or corpuscles, the centers thus being connected and brought into relationship, through the fibers of the fibrous portion, with every part of the body; these fibers being intricately disposed and arranged, but each one serving, by its origin and termination, a special function, and conducting the same kind of impression in the one direction, always.

The fibers which conduct impressions outward from nervous centers are termed *centrifugal* or *efferent*, while those which convey external impressions from without to nervous centers are termed *centripetal* or *afferent*. The centrifugal fibers convey motor, secretory, reflected, and trophic impulses; the centripetal fibers convey the various impressions imparted to the senses, as of pain, local irritation, and the special senses, to the central ganglia.

The originating ganglia of nervous impulses are situated, usually, within the cranium, though the fibers which proceed from them, in many instances, traverse secondary or subsidiary centers further down the track, which augment or modify, perhaps, the primary impressions.

The originating centers of reflex action, however, are located in the spinal cord; but even over these functions the brain exercises a certain controlling influence—not absolute, but sufficient, when concentrated, to hold in abeyance many impulses, which would naturally lead to irrational action.

The integrity of the nervous system—perfect performance of its functions—must depend upon (1) structural excellence of the generating centers, with proper relationship between them, (2) upon a normal condition of the conducting fibers, and (3) upon absence of abnormal irritation in any part of the body, to give rise to perverted reflex action.

Degenerative changes or destruction of tissue in the nervous centers in any other way, will be the occasion of loss of power in the part or parts normally supplied with stimulus from the area of lesion, though the conducting medium be perfect; and with normal generating power, if the nervous fiber which should conduct the impression be interfered with, in any part of its course, arrest or perversion of the function of the part supplied must follow.

The therapeutics of the nervous system may be divided into (1) general and (2) special.

The general therapeutics are such as apply, in principle, to other portions of the body—such as apply to the circulatory and interstitial functions. The circulation should be kept in proper balance, for no part of the body is more susceptible to effects of disturbance of the blood stream than the nervous centers. Besides the influence of the

circulation on nervous structure, another important element is the plastic power residing there, and capable of being influenced by remedies which specifically affect the offices of structure and function.

To influence the circulation, the special sedatives are very appropriate, especially in acute diseases where the morbid condition is confined principally to the blood-vessels. *Gelseminum* in phrenitis, *jaborandi* in meningitis, and *belladonna* in capillary congestion, for instance, are remedies of unquestionable value. Then *rhus tox.* exerts an influence peculiar to itself upon the cerebral circulation—one of great value where the disturbance of the blood stream is more local than general, and marked by excessive excitation in the cerebral centers—out of proportion to the general vascular disturbance, with, perhaps, delirium.

Professor Scudder, in his "Practice of Medicine," proposes to determine the condition of the cerebro-spinal system, so far as the application of the special sedatives is concerned, by the appearance of the eye, two conditions being defined: active (1) and passive (2) hyperæmia. Active hyperæmia is evidenced by the bright eye and contracted pupil, restlessness, and other indications of determination of blood, and the condition is asserted to suggest *gelseminum*, which it undoubtedly does.

On the other hand, the dull expressionless eye, with dilated pupil and feeble circulation, is asserted to indicate the need of *belladonna*; another indisputable proposition.

I am of the opinion, however, that these remedies are not always confined to the conditions named. *Belladonna* has controlled cerebral disturbance for me where the bright eye, flushed countenance, contracted pupil, and restlessness, seemed to call for *gelseminum*, after the latter drug had failed to make an impression upon two days or more of trial; but there was a debility of the general

circulation here which contra-indicated gelseminum, with marked local cerebral symptoms. As before remarked, gelseminum should usually be thought of as a remedy for the determination of sthenia. Belladonna serves a good purpose in the condition of hebetude just described, but it also acts well in many cases of cerebral excitement, if the dose is minute; the third decimal attenuation should be employed, however, in small quantities, when administered where the symptoms indicate cerebral excitement.

Such agents as nitro-glycerine and nitrite of amyl, through their influence upon the inhibitory fibers of the pneumogastric, lessen arterial tension and thus diminish cerebral pressure. Many cases of cephalalgia are thus readily controlled by the effect of remedies which reach the nervous system only so far as exercising a certain control over the amount of blood in the part or over its rate of motion.

Degenerative changes, however, soon follow upon long-continued vascular disturbance, and may arise independently of them. Here we must rely upon agents which are more far-reaching in effect—remedies which have more to do with cell formation and the building of other histological elements.

Then such agents as the phosphate of magnesium, or of potassium, or other inorganic elements of nervous structure, may be found of better service—remedies which supply the elements of structure, as well as augment, perhaps, the tissue-building processes. Electro-therapeutics possess special virtues in either vascular or interstitial lesions.

Special therapeutics of the nervous system have not yet been well developed. Physiology has but recently begun to locate special centers of function, and it is not strange that the therapist should have made but little

headway in adapting his means to these discoveries. However, enough has been learned to suggest adaptation and perhaps stimulate further investigation, in a number of instances.

THE CEREBRUM.

The cerebrum is probably the center of all functions which connect the inner consciousness of the individual with the outer world, as of motion and sensation; and it is also (1) the medium of perception of those clear and more impressive sensations, which can be retained, and regarding which judgment can be formed; (2) also of the will, in so far as deliberate preconceived action is concerned; (3) of retaining impressions of sensible things, and reproducing them in subjective sensations and ideas; (4) of all the higher emotions and feelings, and of faculties of judgment, understanding, memory, reflection, induction, imagination, and the like.

Cerebral Centers.—Various centers of function have been localized in the cerebrum, of which knowledge is important, as it possesses a therapeutic bearing of no little consideration. These, as so far located, are (1) *motorial* or centers of motion situated upon each side of the cortex, upon areas corresponding to the ascending parietal and ascending frontal convolutions, the movements of the leg of the opposite side being represented at the upper part, and in succession downwards, the arms, the face, the lips, and the tongue. Then we have (2) the *visual* or *optic* center, located upon the outer convex part of each occipital lobe. The *olfactory* center (3) is believed to be in the anterior extremity of the uncinate gyrus. The *auditory* center (4) is situated in the monkey's brain, in the first temporo-sphenoidal convolution, representing the auditory apparatus of the opposite side. Destruction of this center causes complete deafness of the opposite ear.

Therapeutics of the Mental Sphere.—If the brain is the

organ of the mind, and special regions are devoted to special functions, and special remedies manifest a selective affinity for special parts, there is no reason that we shall not in time be able to control many morbid psychological manifestations with medicinal agents. Materialism thus offers a way for the accomplishment of what the "mind cure" crank will seek in vain.

A few drugs affect cerebral functions notably. Hyoscyamus, for instance, when given in material doses, just short of a poisonous effect, produces delirium, hallucinations, and garrulousness. The patient is inclined to be quarrelsome.

Stramonium also disturbs the brain, but loquacity and quarrelsomeness are not among its prominent symptoms. The aberration produced is more of action and less of speech. Beverly describes the influence of stramonium upon soldiers who took an overdose at Jamestown, as follows: "They turned natural fools for several days. One would blow up a feather in the air, another would dart straws at it with much fury, and another, stark naked, was sitting up in a corner like a monkey, grinning and making mouths at them; a fourth would fondly kiss and paw his companions, and sneer in their faces, with a countenance more antic than in any Dutch droll. In this frantic condition they were confined, lest they should, in their folly, destroy themselves, though it was observed that all their actions were full of innocence and good nature. After eleven days they returned to themselves again, not remembering anything that had passed."

Both hyoscyamus and stramonium influence the sexual propensities, the delirium of hyoscyamus being marked by obscenity, and those intoxicated by stramonium often exhibiting marked voluptuous and indecent sexual excitement, as, for example, by exposure of the sexual organs. The homeopaths regard the form of mania arising from

disturbance of the reproductive apparatus coming on after childbirth,—puerperal mania,—as especially calling for stramonium.

An estimable lady, nearly past the climacteric, once complained to the writer of a disposition to quarrel with her husband. She averred that he was an indulgent husband and kind father to her children, but for all that every time he came into her sight the impulse to give him a scolding became irresistible. She had no reason for complaint, her domestic relations having always been pleasant, and she was sorry every time she gave way to the impulse, yet she could not help it.

Ten drops of mother tincture of hyoscyamus were added to a four-ounce vial of water, and the patient directed to take a teaspoonful every three hours. In a few days she returned for certain local treatment, which had been going on for several weeks, and reported her quarrelsome disposition entirely gone.

The *tela araneæ* produces certain peculiar mental symptoms. If a drug impresses a part unpleasantly, lessen the dose and you may fairly expect a pleasant and restorative effect if the same locality be diseased. Upon a number of occasions I have had my patient complain of frightful dreams after the use of *tela* as a hypnotic. An old physician just convalescing from an attack of bronchitis, who had been sleepless for a number of nights, after taking small doses of this agent rested well apparently, and reported himself much refreshed in the morning, but asserted that he had been fighting wild animals all night, and this is the experience of many others who take it.

The mental sphere of *pulsatilla* is familiar to the majority of Eclectic physicians. Scudder gives the indication as “a fear of impending danger.” In many cases of supposed heart disease we find *pulsatilla* to have a prompt and pleasing effect, but it is in those cases where

the mind and not the heart is at fault. The patient comes complaining of unpleasant cardiac symptoms, and manifesting a dread of serious results. You make a careful and thorough physical exploration, and decide that no cardiac trouble is present, but that the difficulty lies in the sensorium. You prescribe pulsatilla and your patient soon reports the unpleasant heart symptoms gone. We often find this the case in instances where the mind of the patient centers itself on some other part of the body, and worries him into horrors over an impending doom. Pulsatilla relieves the brain symptoms if they are only functional, and the imaginary disease disappears.

Numerous other agents exercise an influence in this direction, but the intent here is not to individualize drug action so much as to indicate the general application of different classes. In *Specific Therapeutics* this subject will receive all the attention accessible material affords.

The *motor areas* are not known to possess many therapeutic affinities, though these doubtless exist. We must rely largely, for encouragement of muscular power upon those general measures which impart tone to the cerebral mass, with mechanico-therapeutics, faradism, etc., to aid. Nux vomica and its analogues excite the reflex centers in the spinal cord, but do not act through the brain, as is proven by the fact that after section of the upper portion of the cord the toxic action of the drug is still manifested by tetanic spasms in parts supplied by nerves which originate below the point of division, when introduced into the circulation.

As the sensory fibers are distributed among the motor centers, peripheral influences are, doubtless, transmitted here in such a manner as to prove invigorating, when properly applied. In the absence of specific agents, then, we may directly reach these centers from the surface with massage, faradism, and like means.

The prompt relief afforded by minute doses of mercury in languor, where there is good muscular development but sense of dread for voluntary movement, suggests an affinity here. This conviction must force itself upon anyone who has repeatedly observed the prompt restorative effect of *mercurius dulcis* in such cases. Perhaps, then, it would be best to make this single exception to the assertion that this center has no specifics.

The *optic* centers possess therapeutic affinities of great worth, not only to the specialist, but to the general practitioner as well. Quite a number are at present known. Some of them act upon the circulation, as *rhus*, *euphrasia*, and *conium*; others upon the centers of reflex action as *calabar bean*, *belladonna*, and *pilocarpin*. But the mechanism and functions of the visual apparatus are so complicated that we cannot attempt to go very far into this subject without fear of confusion. *Salicylate of sodium* directly influences the visual centers, judging from the hallucinations which sometimes accompany its use. *Nux vomica* possesses the reputation of sharpening the vision. Other examples exist.

The *olfactory* center possesses no drug affinities so far as at present known.

The *auditory* center is impressible by some drugs. The *tinnitus aurium* due to the action of *quinia* is familiar to almost everyone. *Salicylic acid* also evidently influences this center, as it cures deafness attended by *tinnitus*, in some cases, where the auditory apparatus is intact. Oil of *mullein* has also been found a remedy for deafness, and its influence probably depends upon its affinity for this center. *Pulsatilla*, and *piper methysticum*, act, probably, through the afferent nerves of the auditory apparatus, as they relieve pain, but exert little influence in faulty hearing.

The center for *taste* has not yet been localized.

THE CEREBELLUM.

The cerebellum is the center of muscular co-ordination. Destruction of this portion of the brain in the lower animals, results in feebleness and want of harmony in the action of the various groups of voluntary muscles; and the power of preconcerted action, as springing, flying, walking, or standing, etc., is lost.

“On the other hand, Foville supposed that the cerebellum is the organ of *muscular sense*; i. e., the organ by which the mind acquires that knowledge of the actual state and position of the muscles which is essential to the exercise of the will upon them; and it must be admitted that all the facts just referred to are as well explained on this hypothesis as on that of the cerebellum being the organ for combining movements. A harmonious combination of muscular actions must depend as much on the capability of appreciating the condition of the muscles with regard to the tension and to the force with which they are contracting, as on the power which any special nerve-center may possess of exciting them to contraction. And it is because the power of such harmonious movement would be equally lost, whether the injury to the cerebellum involved injury to the seat of muscular sense, or to the center for combining muscular actions, that experiments on the subject afford no proof in one direction more than the other.”—*Kirke's Hand-book of Physiology*.

Therapeutic affinities for the cerebellum are as yet not well defined. Some drugs, notably alcohol, disturb the powers of co-ordination markedly, but that this is the effect of specific action so much as of a general influence in the blood which pervades all the tissues is a matter of doubt.

THE MEDULLA OBLONGATA.

This portion of the brain is intimately associated with the sympathetic nervous system, as well as receiving and

transmitting fibers from the upper portions of the encephalon to the spinal cord. It also is the point of location of several important nervous centers which preside over special functions.

The special centers in the medulla are as follows:—

A center for the co-ordinated movements of *mastication*. No therapeutic affinities known.

A center for the movements of *deglutition*. Through this, muscles of the palate, pharynx, and œsophagus, produce the successive co-ordinate movements necessary to the act of deglutition. Therapeutic affinities: Lachesis, pulsatilla, strychnia.

A center for the co-ordinated movement of *sucking*, involving impulses along the facial for the lips and mouth, the hypoglossal for the tongue, and the inferior maxillary division of the 5th for the muscles of the jaw. No therapeutic affinities known.

A center for the *secretion of saliva* transmitting impulses by the chorda tympani and branches of the sympathetic to the salivary glands. Therapeutic affinities: Iris, jab-
orandi, mercury.

A center for *vomiting*. Therapeutic affinities: Ipecac, lobelia, tartar emetic, etc.

A center for *coughing*, supposed to be separate from the inspiratory center. Therapeutic affinities: Corallium rubrum, drosera, lachesis, sticta pulmonaria, tartar emetic.

A center for *sneezing*. Therapeutic affinities: Alnus serulata, aralia racemosa, sticta pulmonaria.

A center for the *dilatation of the pupil*, from which proceed fibers through the third nerve and the last two cervical and two upper dorsal into the cervical sympathetic. Therapeutic affinities: Belladonna, salicylic acid, santonin, etc.

A *respiratory* center. Therapeutic affinities: Aspidos-

perma quebracho, cactus grandiflorus, hydrocyanic acid, lachesis, tartar emetic, etc.

Vaso-motor center. "Experiments by Ludwig and others show that the vaso-motor fibers come primarily from gray matter (*vaso-motor center*) in the interior of the medulla oblongata between the calamus scriptorius and the corpora quadrigemina. Thence the vaso-motor fibers pass down in the interior of the spinal cord, and issuing with the anterior roots of the spinal nerves, traverse the various ganglia on the pre-vertebral cord of the sympathetic, and accompanied by branches from those ganglia, pass to their destination.

"Secondary or subordinate centers exist in the spinal cord, and local centers in various regions of the body, and through these directly, under ordinary circumstances, vaso-motor changes are also effected.

"The influence exerted by the chief vaso-motor centers is not only in constant moderate action, but may be altered in several, but chiefly by afferent (sensory) stimuli. These stimuli may act in two ways, either increasing or diminishing the usual action of the center which maintains a medium tone of the arteries. This afferent influence upon the center may be extremely well shown by the action of a nerve the existence of which was demonstrated by Cyon and Ludwig, and which is called the *depressor*, because of its characteristic influence on the blood-pressure.

"*Depressor Nerve.*—This small nerve arises, in the rabbit, from the superior laryngeal branch, or from this and the trunk of the pneumogastric nerve, and after communicating with filaments of the inferior cervical ganglion, proceeds to the heart.

"If during an observation of the blood-pressure of a rabbit this nerve be divided, and the central end (*i. e.*, nearest the brain) be stimulated, a remarkable fall of

blood-pressure ensues. The cause of the blood-pressure is found to proceed from the dilatation of the vascular district within the abdomen supplied by the splanchnic nerves, in consequence of which it holds a much larger quantity of blood than usual. The engorgement of the splanchnic area very greatly diminishes the blood in the vessels elsewhere, and so materially diminishes the blood-pressure. The function of the depressor nerve is presumed to be that of conveying to the vaso-motor center indications of such conditions of the heart as require a diminution of the tension in the blood-vessels; as, for example, that the heart cannot, with sufficient ease, propel blood into the already too full or too tense arteries.

"The action of the depressor nerve illustrates a somewhat unusual effect of afferent impulses, as it causes an inhibition of the vaso-motor center. As a rule, the stimulation of the central end of an afferent nerve produces a reverse effect, or, in other words, increases the tonic influence of the center, and by causing considerable constriction of certain arterioles, either locally or generally, increases the blood-pressure.

"Thus the effect of stimulating an afferent nerve may be either to dilate or to constrict the arteries. Stimulation of an afferent nerve, too, may produce a kind of paradoxical effect, causing *general* vascular constriction and also general increase of blood-pressure, but at the same time *local* dilatation, which must evidently have an immense influence in increasing the flow of blood through the part.

"Not only may the vaso-motor center be reflexly affected, but it may also be affected by impulses proceeding to it from the cerebrum, as in the case of blushing from mind disturbance, or of pallor from sudden fear. It will be shown, too, in the chapter on Respiration that the circulation of deoxygenated blood may directly stimulate the center itself."—*Kirke's Hand-book of Physiology*.

The therapeutic affinities of the vaso-motor center comprise an extensive list. The "special sedatives" exert their influence through impressions made here, in all probability, and may produce effects of opposite nature, according to the size of dose administered. Minute doses act as vaso-motor stimulants, improving the tone of the circulation, while larger ones may impress the vasodilators and produce an inhibitory effect. Another class may act directly as vaso-motor depressors, producing an inhibitory effect from the start, though it is not improbable that the influence of all inhibitory agents is stimulating to the vaso-motor centers when administered in sufficiently small doses.

Jaborandi in minute quantities improves the power of the heart and blood-vessels to carry on an equal and active circulation, but in full doses its inhibitory effect is speedy and marked, the pallid, cold, clammy surface evidencing rapid departure of the blood from the superficial parts. Minute doses of nitro-glycerine also energize the circulatory functions, though in somewhat larger doses its vaso-depressor influence is unmistakable; and so with aconite, veratrum, and other vascular sedatives, though some of this class act more directly upon the heart.

Local centers have been shown to exist in the general vaso-motor tract,—centers which preside over such organs as the liver, spleen, and kidneys. Probably, further research will develop knowledge of a special center for every organ and distinct vascular area in the body. It is probable that here is the point of impression of specific agents which influence the vascular state of various parts to control morbid action in them. Syzygium and nitrate of uranium have been suggested as agents influencing the *diabetic center*; doubtless renal, splenic, gastric, intestinal, and other groups exert an influence of this kind.

The abdominal circulation is influenced by a class of agents which possess an effect opposite to that of the vaso-dilators. Probably there exists in the medulla, *tonic* centers, through which the vascular walls are strengthened. It is evident, at least, that a class of agents like *carduus marianus*, *grindelia squarrosa*, *polymnia*, etc., tend to lessen the amount of blood in the abdominal vessels.

A center for the secretion of *sweat*, which controls subsidiary spinal sweat centers, exists in the medulla. Therapeutic affinities: *Jaborandi* and other specific diaphoretics. *Picrotoxine*, *atropia*, and other agents which arrest profuse sweating, probably possess specific affinities for this center also.

THE SPINAL CORD.

The spinal cord represents a column of conducting fibers which convey impressions from the brain toward the periphery, and *vice versa*, and from which is distributed to the vegetative system the filaments which serve largely to constitute its bulk. Within the fibers of this cord, however, are located at intervals masses of vesicular matter—ganglia or special centers—many of which subserve functions subsidiary to those of the brain, though some of these—the reflex centers—are evidently independent.

The functions of the cord are classed as *conducting*, *transferring*, and *reflecting*.

The special centers of the cord, so far as located, are principally situated in the lumbar region. They are as follows:—

A center for *defecation*. “The mode of action of the ano-spinal center appears to be this. The mucous membrane of the rectum is stimulated by the presence of feces or gases in the bowel. The stimulus passes up by the afferent nerves of the hemorrhoidal and inferior mesenteric plexus to the center in the cord, situated in the

lumbar enlargement, and is reflected through the pudendal plexus to the anal sphincter on the one hand, and on the other to the muscular tissue in the wall of the lower bowel. In this way is produced a relaxation of the first and a contraction of the second, and expulsion of the contents of the bowel follows. The center in the spinal cord is partially under the control of the will, so that its action may be either inhibited or augmented or helped.

"The action may be helped by the abdominal muscles which are under the control of the will, although under a strong stimulus they may also be compelled to contract by reflex action." Therapeutic affinities: Collinsonia, *æsculus glabra*, *æsculus hippocastanum*, *podophyllum*. The influence of these drugs is probably peripheral, *i. e.*, the primary action is upon the tissues of the rectum, and the impression transmitted to the spinal center by peripheral branches.

A center for *micturition*—vesico-spinal center. This center acts in a similar manner to the center for defecation, the presence of urine in the bladder being the stimulus which excites the peripheral nerves and calls into action impulses in the center which are transmitted to certain muscles which contract, and to the sphincter, which relaxes. Therapeutic affinities: Cantharis, *eryngium*, *gelseminum*, *nux*, *sabal serrulata*, *santonin*, etc.

A center for *emission of semen*. Therapeutic affinities: *Phosphorus*, *avena sativa*, *gelseminum*.

A center for the *erection of the penis*. Therapeutic affinities: *Cantharis*, *damiana*, *phosphorus*, *salix nigra*; the latter, with other anaphrodisiacs, exerts a sedative or inhibitory influence.

A center for *parturition*. Therapeutic affinities: *Caulophyllum*, *cimicifuga*, *ustilago*, *secale*, etc.

Centers of *nutrition* are believed to be located in the spinal cord, and probably possess their therapeutic affini-

ties. Injury or disease of the cord is followed by atrophy and even by sloughing of the muscles, if serious in nature. The bones and joints are also subject to disease, when the cord is seriously affected.

THE SYMPATHETIC NERVOUS SYSTEM.

This system consists of several series of ganglia located outside the cranium and spinal canal, and principally within the thorax and abdomen, which though intimately connected with the spinal cord (receiving and transmitting fibers from the spinal canal, which become minutely subdivided after association with them), possess an independent function of their own, viz., the power of perpetuating vital characteristics for a short time after separation from the central nervous system.

The heart of a mammalian continues to beat one or two minutes, and that of an amphibian will pulsate for hours after complete removal from the body, evincing thus the fact that a kind of independent existence belongs to the parts supplied by this system, which maintains the functions of organic life without necessity of the consciousness or effort of the individual.

The ganglia of the sympathetic are divided by Gaskill into four classes: (1) A connected double chain of lateral or vertebral ganglia; (2) a more or less distinct prevertebral chain consisting of the semilunar inferior mesenteric and similar plexuses; (3) a class of ganglia—terminal ganglia—situated in the organs and tissues themselves; and (4) the ganglia of the posterior spinal nerves.

The functions of the sympathetic system seem to be (1) the perpetuation and distribution, in a modified form, of impulses from the cerebro-spinal system, the numerous ganglia sending out multiplied branches to preside over the functions of the cardio-vascular, absorbent, nutritive, secretory, and other involuntary functions, by which existence is maintained, and (2) the perpetuation, in certain

organs, of rhythmical action independent of the impulses from the central nervous system. For instance, the heart receives augmenting and inhibitory fibers from the cerebro-spinal system, but rhythmical action in the organ depends upon the existence of terminal ganglia embedded in its walls, to which specific agents must be directed when irregular cardiac action, as intermittent beat, indicates disturbance of these centers.

The sensation of pain, in parts supplied by the sympathetic, is usually slow in being aroused, but is persistent and difficult to control by agents which act directly upon the cerebro-spinal centers. Anodynes and narcotics reach parts supplied by this system with less certainty, and are often found but poor dependence in such cases. Many a case of fatal narcotism has been the result of the crowding of opiates for the relief of abdominal pain; the cerebro-spinal system has become paralyzed before the narcotic impression has reached the vegetative system with sufficient force to disguise the effect of the morbid state.

Abdominal pain is more successfully and satisfactorily relieved by specific agents exerting an affinity for this region, usually, than by opiates or other narcotics.

The readiness of parts supplied by the sympathetic nervous system, to respond to remedies, is peculiar. In fact, a large share of the positive knowledge of therapeutics is what is known of the therapeutics of the thoracic and abdominal viscera.

SECRETION AND EXCRETION.

The act of secretion is the separation of specific products from the blood, by glandular processes. Material separated for use in the body, or for the nourishment of the young, as the lacteal fluid, is termed a *secretion*; that for rejection, as waste, an *excretion*.

The secretions are always separated by glandular ac-

tion; some of the excretions are simply strained through membranous walls, as the exhalation from the lungs; others, as, for instance, the epithelium, are removed by attrition, while the kidneys and sudiparous glands remove excretory products by a process similar to that by which the true secretions, as the milk, saliva, mucus, etc., are separated,—through the growth and deliquescence of cells.

Every secreting apparatus consists of a *basement membrane*, supporting *cells* and *blood-vessels*, the vessels being placed in such intimate association with the cells that the latter multiply and grow rapidly during active stages of secretion, imbibing their pabulum from the blood and deliquescing at maturity, the resulting fluid constituting the secretion.

Certain circumstances determine activity of secretion from a gland. These are: (1) The amount of blood, in the absence of febrile action; (2) activity of the presiding nervous center; (3) amount of elaborative material in the blood capable of contributing to the formation of the secretion under consideration.

Cerebral impulses favor secretion by imparting stimulus to the centers presiding over the gland, as when thoughts of food increase the flow of saliva in hunger.

In febrile states, arrest of both secretion and excretion is a prominent and persistent symptom, suggesting an intimate relationship between these functions and the circulation of the blood. When evidences of returning secretion and excretion appear, a subsidence of the fever is regarded as a certain result—near at hand.

The secretions subserve special purposes, each secretory organ or apparatus being devoted, exclusively, to its own function, but the organs of excretion are more common in their offices, the one sometimes performing vicariously the functions of another, as when in obstruction of

the tubules of the kidneys, the skin, by transference to a favorable climate or by the use of *jaborandi*, relieves the blood (for a limited time at least, and to a certain extent) of urea.

The three principal agents of excretion are the kidneys, lungs, and skin, and between these there is a certain reciprocity of action, though the kidneys excrete more largely of urea, the lungs of carbon dioxide, while the skin, to a more limited extent, in each case, performs both offices.

The principles of dynamical therapeutics demand that in the influencing of secretion or excretion, avoidance of the large dose shall be observed. An organ unduly stimulated becomes debilitated in the end, and the purpose of medication is thus finally defeated. True, cases of emergency may demand the large dose, but this is contrary to the principles of sanative medicine, and should be abandoned as soon as temporary results have been attained. Thus in anasarca states, active hydrogogue cathartics may sometimes serve to rid the cellular tissues of an objectionable accumulation of fluids, but this must always be at the expense of the integrity of the vascular tissues of the intestinal mucous membrane. So with powerful diuretics; the kidneys may be stimulated to active work, for a time, and apparent good result follow, but there afterwards arises the question, How much have the renal tissues suffered from this excitement?

The special sedatives are promoters of both secretion and excretion, by controlling vascular excitement, and thus relieving the special centers governing these functions, of embarrassing over-stimulation. How much contiguity of location and other relationship between the vaso-motor centers and the centers of control of these functions influence the result, is a question; but, clinically, it has been proven that in febrile states, the best remedies

to improve secretion and excretion are those which equalize the sanguineous circulation, and reduce its movement to the normal rate.

Diet and climate bear an important relation to the organs of excretion, especially in chronic disease. An overplus of material consumed calls for undue effort for its removal, the proteids, particularly, when partaken in large amount, calling for extra work for their elimination. In the matter of climate, we must recollect that a cool, moist atmosphere lessens the ability of the lungs and skin to excrete, thus throwing more of a burden upon the kidneys; consequently, if these organs become diseased, a *change* is demanded. A warm, dry air will now throw more of the burden upon the lungs and skin, thus allowing the kidneys to rest. A cool, dry air permits the lungs to divide duty with the kidneys, to a certain extent, and is preferable to the damp atmosphere of the sea-coast in renal affections. On the other hand, many cases of anemia and general debility, with pulmonary and cutaneous relaxation brought on in the hot, dry climate of the interior, improve rapidly in the bracing atmosphere of the sea-shore, or in a more northerly latitude.

The centers of control over secretion or excretion may be permanently injured by drugs which powerfully affect the medulla or spinal cord, and a state of cutaneous relaxation result, which will be liable to persist for a lifetime. This is especially so as regards ergot, a common class of such cases being women who have been overdosed with this drug by ignoramuses, during labor or for the purpose of producing abortion, a clammy, relaxed condition of the skin, with attendant debility, permanently remaining.

There is also a probability that the kidneys may thus become permanently diseased. It is indisputably established that injuries to the brain may give rise to perma-

ment relaxation of the capillaries of the kidneys or liver, and final structural change of the part congested.

The important organs of secretion are the liver, pancreas, salivary glands, mucous and serous membranes, and mammæ.

The *liver* has been sufficiently noticed in the consideration of the portal circulation.

Of the *pancreas* little is known as regards its therapeutics. Its physiological affinities are iodine, iris, and mercury, but the application of these agents to diseases of the organ has never been made.

The therapeutics of the *salivary glands* are of importance with reference to excessive secretion—ptyalism. This may be controlled by minute doses of agents which manifest an affinity for the organs, as jaborandi, mercury, or iris versicolor. A better effect, however, may sometimes be derived from galvanization of the tongue in the obstinate ptyalism of pregnancy. Lack of activity in the salivary glands usually depends upon constitutional states, which are reached by remedies that modify disturbance of the general circulation.

The *mucous membranes* manifest various affinities in different parts; and these are so numerous that reference to Specific Therapeutics should be made, where they will be described in detail.

Serous membranes possess few known affinities. Possibly bryonia, apocynum, and sourwood, may specifically impart tone to them in relaxed conditions, but whether even this feeble influence is on account of any direct action upon the pavement epithelia, which constitute the secretory structure, is a matter of doubt.

The *mammary gland* possesses a number of positive specifics. The vascular area described in the mamma is most markedly influenced by phytolacca, the gratifying, and almost certain action of this agent in mastitis, especially that following childbirth, being one of the eminent

certainties of medicine. The power of jaborandi to increase the flow of milk, of saw palmetto to influence nutrition, and of bryonia to relieve painful conditions here, are also among the established facts of therapeutics.

The specific affinity of castor-oil for the mammary gland should be recognized, as a warning against the stupid but time-honored custom of purging lying-in women with it upon the third day of confinement; doubtless many a case of mastitis and resultant mammary abscess is set up by engorgement of the lacteal ducts in consequence of such practice.

Crises in disease have been recognized since the days of antiquity. A favorable crisis is attended by sudden establishment of the secretions and excretions. The skin especially becomes bathed in profuse perspiration and convalescence immediately follows. The lesson suggests the propriety of endeavoring to establish an artificial crisis early in the course of severe fevers, as continued, typhoid, etc. Even if the disease cannot be abated by such efforts, its severity may often be so lessened as to leave but little after treatment necessary, except careful nursing.

Such measures comprehend the use of the hot pack, the spirit vapor bath, or other powerful sudorifics, early, before the system has lost its reactive energies.

TISSUE REGENERATION.

The repair of injured tissue is a subject which suggests itself every day, to the inquiring physician.

Three factors may be considered as exerting a controlling influence in the renewal of the life of the tissues: (1) The blood supply; (2) the trophic nervous supply; and (3) the formative force—plastic power—residing in the histological elements, or cells.

These demand, as an indispensable requisite, proper pabulum, which will depend, for its production, upon

appropriate food supply, normal digestion, and the due excretion of effete elements.

The vascular supply serves at least, then, the purpose of the transportation of the elements of growth to, and those of decay from, the tissues; partial arrest of the normal blood-supply from a part is followed by atrophy, and complete arrest by death—gangrene. Proportionate to the amount of disturbance in the circulation of a part is its tissue integrity. Feeble capillary circulation with engorgement of the vessels is attended by all the unpleasantness of a chronic inflammatory condition.

Circulatory disturbances play an important part in almost every local lesion; whatever other factor is at fault, the circulation participates. In inflammation, one of the first evidences of pathological changes is that found in the blood-vessels; this giving rise to increased rate of motion, attended by exudation and the transmigration of leucocytes, to be followed by rapid cell proliferation. Later, sluggish movement, imperfect supply of nutritive material, and tardy removal of broken-down tissue follows.

Function is thus impaired; and the circulation requires to be put in the best condition possible, that the life of the part may be sustained, its normal interstitial integrity restored, and its vital purposes subserved.

It is a fact that all the demands of this subject cannot be satisfied by the administration of medicine. Mechanical causes may give rise to most mischievous results, and restoration may depend more upon an understanding of the principles involved, and rational application of appropriate mechanical correction, than upon the selection of drugs.

Thus, galloping consumption may prove speedily fatal in subjects whose lungs have been the seat of hypostatic congestion, due to long continued decubitus, without

change of position, while the parts are extremely debilitated, as in typhoid fever. A threatened mastitis may be aborted, and even when developed, the action of the correct remedies may be much aided by giving the gland proper support. An irritable ulcer upon the lower extremity will soon heal, if the part be elevated, so that the hydrostatic pressure consequent upon the upright position is removed, and the vascular congestion thus modified. Graily Hewitt ascribes chronic inflammatory conditions of the uterus to flexions and versions, and proposes to remedy these perverse conditions by correcting the displacement, thus removing obstruction to the vascular circulation at the cervix.

Rest, also, may relieve the vascular engorgement—which perpetuates depravity of a tissue—and thus aid in its repair, as when the pulmonary mucous membrane is being congested and the condition continually aggravated by repeated coughing, such means as quiet the cough and afford the parts complete rest, conduce to restoration of the irritated membrane. Here the will-power of the patient, if he can be shown the importance of exercising it, may be of utmost service. How many fatal cases of pulmonary disease might be averted, if the importance of smothering the desire to yield to slight inclination to cough were recognized by the subject in the beginning!

The futile and illy-directed efforts of subjects afflicted with pharyngitis, laryngitis, coryza, dysentery (recto-colitis), cystitis, etc., in giving way to impulses due vascular congestion of the respectively diseased mucous surfaces, are frequent causes to which confirmed chronic diseases of the organs involved are referable at a later period, and should not be forgotten by the physician who prizes his reputation above mere lucrative results.

The influence of remedies for the circulation, in subserving the integrity of the tissues, is of the highest im-

portance. The field of therapeutics of the circulation, in this respect, should be separated into two departments: (1) That which considers remedies applicable to the general circulation, as the special sedatives, and (2) that which has to do with special vascular areas.

To Scudder must be given much, if not all, the credit of adapting the special sedatives to the treatment of inflammatory conditions. Localized hyperæmia, if acute in character, may be controlled nicely, in the majority of cases, by those remedies which modify excitement in the general circulation, and tend to equal distribution of blood. Determination to an irritated part is thus inhibited, the vessels strengthened, and the stream equally propelled to all parts of the body.

Aconite, belladonna, gelseminum, jaborandi, veratrum, and other vaso-motor specifics, thus become important agents in guarding against excessive vascular disturbance in a part affected by inflammation, and by preventing excessive tension and oxidation, maintain its vitality and conduce to ready restoration of affected parts after convalescence.

But these may often be assisted or successfully set aside by agents which possess specific affinities for a given vascular area including the point of local irritation.

Pharyngitis, for example, may be benefited by the sedatives, and probably brought to a successful termination through their action upon the general circulation; but phytolacca so much more promptly controls the symptoms that we must ascribe to it a specific influence upon the circulation in this part. True, the prompt action of this agent in healing aphthous ulceration, might suggest a tissue affinity of a different character, and it is not impossible that both virtues belong to the drug; *i. e.*, a specific influence upon the vessels of the pharynx, through a special motor center, and an affinity for the structure of the

oral mucous membrane, which adds to its plastic, or recuperative power.

In laryngitis, the sedatives generally prove valuable, but certain drugs seem to exert a more marked influence than that which can be obtained by a general action upon the circulation at large. Aconite, while of less power as an inhibitory agent than some of the other cardiovascular sedatives, perhaps, exerts here a speedy effect beside that of some others; and potassium bichromate, though not an arterial sedative in any sense, removes subacute inflammation and regenerates tissue here with surprising readiness, when *hoarseness* is the prominent symptom.

The vascular area described by the bronchial vessels offers another example. Veratrum here seems more appropriate than other arterial sedatives, but *asclepias tuberosa*, while a feeble cardiac sedative, if it exerts any influence at all, excels even that powerful vaso-depressor, hellebore, in controlling excitation in this area; and so we find it with ipecac, as regards the enteric mucous membrane, collinsonia in rectal disturbances, etc.

Little is known of the influence of the nervous system over the regeneration of tissue, that can exert a therapeutic bearing. Trophic centers evidently exist in the spinal cord, and probably possess their affinities, which may yet be discovered and found to possess therapeutic uses, but at present we can only recognize the principle and lay it by for future reference, when we have passed a little further along the road of therapeutic discovery. We will, therefore, suspend further judgment upon this part of the subject, and quote a few paragraphs, upon the relation of the nervous system to nutrition, from "Kirke's Hand-book of Physiology":—

"It has been held that the nervous system cannot be essential to a healthy course of nutrition, because in plants and the early embryo, and in the lowest animals,

in which no nervous system is developed, nutrition goes on without it. But this is no proof that in animals which have a nervous system, nutrition may be independent of it; rather, it may be assumed, that in ascending development, as one system after another is added or increased, so the highest (and, highest of all, the nervous system) will always be inserted and blended in a more and more intimate relation with all the rest; according to the general law, that the interdependence of parts augments with their development.

“The reasonableness of this assumption is proved by many facts showing the influence of the nervous system on nutrition, and by the most striking of these facts being observed in the higher animals, and especially in man. The influence of the mind in the production, aggravation, and cure of organic diseases is matter of daily observation, and a sufficient proof of influence exercised on nutrition through the nervous system.

“Independently of mental influence, injuries either to portions of the nervous centers, or to individual nerves, are frequently followed by defective nutrition of the parts supplied by the injured nerves, or deriving their nervous influence from the damaged portions of the nervous centers. Thus, lesions of the spinal cord are sometimes followed by mortification of portions of the paralyzed parts; and this may take place very quickly, as in a case in which the ankle sloughed within twenty-four hours after an injury of the spine. After such lesions also, the repair of injuries in the paralyzed parts may take place less completely than in others; so, in a case in which paraplegia was produced by fracture of the lumbar vertebræ, and, in the same accident, the humerus and tibia were fractured. The former in due time united; the latter did not. The same fact was illustrated by some experiments, in which having, in salamanders, cut off the

end of the tail, and then thrust a thin wire some distance up the spinal canal, so as to destroy the cord, it was found that the end of the tail was reproduced more slowly than in other salamanders in whom the spinal cord was left uninjured above the point at which the tail was amputated. Illustrations of the same kind are furnished by the several cases in which division or destruction of the trunk of the trigeminal nerve has been followed by incomplete and morbid nutrition of the corresponding side of the face, ulceration of the cornea being often directly or indirectly one of the consequences of such imperfect nutrition. Part of the wasting and slow degeneration of tissue in paralyzed limbs is probably referable also to the withdrawal of nervous influence from them; though, perhaps, more is due to the want of use of the tissues.

“Undue irritation of the trunks of the nerves, as well as their division or destruction, is sometimes followed by defective or morbid nutrition. To this may be referred the cases in which ulceration of the parts supplied by the irritated nerves occurs frequently, and continues so long as the irritation lasts. Further evidence of the influence of the nervous system upon nutrition is furnished by those cases in which, from mental anguish or in severe neuralgic headaches, the hair becomes gray very quickly, or even in a few hours.

“So many and varied facts leave little doubt that the nervous system exercises an influence over nutrition as over other organic processes; and they cannot be easily explained by supposing that the changes in the nutritive processes are only due to the variations in the size of the blood-vessels supplying the affected parts, although this is, doubtless, one important element in producing the result.

“The question remains, Through what class of nerves

is the influence exerted? When defective nutrition occurs in parts rendered inactive by injury of the motor nerve alone, as in the muscles and other tissues of a paralyzed face or limb, it may appear as if the atrophy were the direct consequence of the loss of power in the motor nerves; but it is more probable that the atrophy is the consequence of the want of exercise of the parts; for if the muscles be exercised by artificial irritation of their nerves their nutrition will be less defective. The defect of the nutritive process which ensues in the face and other parts, however, in consequence of destruction of the trigeminal nerve, cannot be referred to loss of influence of any motor nerves; for the motor nerves of the face and eye, as well as the olfactory and optic, have no share in the defective nutrition which follows injury of the trigeminal nerve; and one or all of them may be destroyed without any direct disturbance of the nutrition of the parts they severally supply.

“It must be concluded, therefore, that the influence which is exercised by nerves over the nutrition of parts to which they are distributed is to be referred, in part or altogether, either to the nerves of common sensation, or to the vaso-motor nerves, or, as it is by some supposed, to nerve fibers (*trophic* nerves), which preside especially over the nutrition of the tissues and organs to which they are supplied.

“It is not at present possible to say whether the influence on nutrition is exercised through the cerebro-spinal or through the sympathetic nerves, which, in the parts on which the observation has been made, are generally combined in the same sheath. The truth perhaps is, that it may be exerted through either or both of these nerves. The defect of nutrition which ensues after lesion of the spinal cord alone, the sympathetic nerves being uninjured and the general atrophy which sometimes occurs in con-

sequence of diseases of the brain, seem to prove the influence of the cerebro-spinal system; while the observation that inflammation of the eye is a constant result of ligation of the sympathetic nerve in the neck, and many other observations of a similar kind, exhibit very well the influence of the latter nerve in nutrition."

A plastic power or formative force, which shapes the building of plastic material into determinate forms, is universally recognized. This principle exists in the simplest forms of organic life, endowing the individual with the faculty of reproducing like forms from nutritive pabulum.

The simplest creatures thus respond to this principle, and, as higher forms are reached, it is not in the least probable that this endowment becomes lost. True, trophic impulses may produce certain effects through nervous supply, but these cannot furnish that element which gives individuality to the recuperative power of every portion of the body, existing within itself.

When the vitality of a part becomes impaired by injury or disease, this recuperative energy suffers, along with the general impairment of structure, and promptness of repair will be in proportion to the amount of plastic force remaining. The relation of formative force to a part may be illustrated by the following simile:—

"Suppose a carpenter builds himself a house, and a cyclone comes along after it is finished and whirls it into fragments, injuring in the meantime its owner. Now, suppose there is no other builder to be had and that the same carpenter in a crippled condition—arms, shoulders and other parts of the body somewhat impaired in their functions—is obliged to build another. The process will evidently be a slow and unsatisfactory one, and when the second structure is finished it will be inferior to the first, even though all the material furnished should be first-

class. Suppose, however, this structure is destroyed, but the owner this time escapes injury. He has now somewhat recovered from the effects of the cyclone and is able by extra effort to construct a better building than the last one. He has been improving, gathering strength as it were, and with the same quality of material approaches a little nearer perfection than before, when impairment of his locomotor and prehensile functions unfitted him, and after he has several times repeated the process he comes quite near the standard of his former excellence, before his injury disqualified him for the purpose."

So it is with a part injured by disease. The blood for its regeneration may be of the best quality, but the builder—the plastic principle, the formative force—has been impaired, and though the blood-vessels carry good building material to the part the cellular elements fail to construct good protoplasm from it, and an imperfect structure gradually takes the place of that weakened by disease. But the tissues are constantly being broken down and repaired, and the physician can aid this formative force by selecting such agents as specifically influence the affected part to improve its recuperative energies; he can further augment its vitality by the local application of properly selected electrical currents; he can guard the part from undue tension or over-exertion by proper attention to details, and after a time, even though the condition has become chronic, he can effect a renewal of the life of the part—an approach towards, if not a complete, recovery resulting.

The nutritional affinity of certain drugs for special portions of the body seems unquestionable; and in some cases this affinity is so powerful as to prove destructive. Potassium bichromate destroys the mucous membrane of the respiratory and digestive tracts, in persons subjected, for a time, to material doses, and it also exerts a healing

effect here, when administered in doses sufficiently small to stimulate the formative force of the affected part without injury.

It might be claimed that such an effect was due to the influence of the drug upon the circulatory area of these parts, but we may refer to the influence of silica upon cartilage, or that of cineraria upon the humors of the eye, where no blood-vessels are found, in refutation.

The selective influence of *sabal serrulata* upon the prostate gland, testes, and mammae, is evidently not of a vaso-motor kind, but one in which the plastic power is concerned—an influence which betters the condition of the parts to appropriate nutriment, and form it into structure of the best quality.

Remedies which improve the formative force of a part must not be expected to accomplish all that is possible of them in a limited time; we must not expect any remedy to bring about its effects magically or immediately; such an idea would have done better for the days of superstition; there must be successive pulling down and building up, repeatedly, upon an improved basis each time, as the architect improves in power, before a chronically diseased part can reach a perfectly normal condition.

I once administered *penthorum sedoides* to a patient afflicted with chronic inflammation of the upper portion of the pharynx, for a year steadily; in the beginning the parts affected presented a bluish, dry, shiny appearance, which had been present for fifteen years. The influence of the remedy was slow, but certain, and when treatment was discontinued, the color, secretion, general appearance, and sensation of the parts, were normal. Yet we would not expect such an effect from *penthorum* upon any other portion of the body, nor need we expect it in acute cases, where the lesion is largely circulatory.

THE NEW FORMATIONS.

It might be considered a question whether this subject is of sufficient importance to justify its notice in a work on therapeutics. However, the fact that new growths, in some instances, can be influenced by remedies through the circulation is generally recognized, and, possibly, when studied more carefully, the subject may be made much worthier a place in the therapeutics of the future.

There is probably a class of new formations which are so near normal tissues in their structure and place of development, that drugs may be made to exert an affinity for them, while in another instance the growth may be developed under such abnormal conditions that drug affinity cannot produce any effect upon it.

Take, for instance, enchondroma: We have here a growth histologically resembling cartilage and following the same developmental course, originating either from connective tissue or bone, its connection and evolution then, in a certain respect, coinciding with those of normal cartilaginous tissue. And there is so close a relation between this growth and normal cartilage, that drugs which manifest an affinity for the latter tissue might reasonably be expected to manifest a like affinity for the morbid development.

We are credibly informed that silica possesses the power of arresting the development of enchondromata, and, while I have never proven the matter in practice, the prompt action of this agent upon true cartilage seems to me to justify the belief that such statement may be correct.

Excessive development of the epithelium of the sebaceous follicles, in the form of verrucæ (warts), is another example where drugs, through the circulation, have been known to perform a cure. Here, also, there is such a close connection between normal tissue and morbid devel-

opment that the histological elements retain a certain normal selective power, perhaps, and are therefore amenable to the influence of such agents as thuja and magnesium sulphate,—drugs which have been known to effect the removal of such growths, when administered internally.

But take such a growth as a dermoid cyst,—a morbid development of the ovary, apparently, yet one containing the histological elements of the true skin, in its composition of cells of corium and epidermis, containing sebaceous and hair follicles and sweat glands, as well perhaps as teeth. Here we have a transplanted tissue developing in a field isolated from its normal position, the result, perhaps, of aberrant cells from the epiblast, lost during early embryonic development, so far removed from their normal position that drug affinity through vasomotor or trophic centers evidently could not exist, nor could the attraction ordinarily believed to be exerted between normal histological elements and drugs be expected to remain with them after removal to so remote a field from the mother soil.

Cancer, also, probably the result of accidental transplantation of epithelial cells to that hot-bed of proliferation, connective tissue, affords another example where little, if any, drug affinity could be expected to exist, if we accept the proposition that the underlying principle of drug affinity is that the attraction must always be between healthy parts and specified drugs, and that in disease the same drugs act upon the normal elements, instead of selecting parts because of morbid changes.

Dr. Cutter has proposed, probably, the best method of cure for cancer—that of starvation; otherwise, a diet consisting of the one article of food, chopped beef, which means only the consumption of barely enough to sustain life. Here the power of the normal elements to appro-

priate what is needed robs the exuberant growth that is rapidly developing and closing up the avenues of life, of needed nourishment, and arrest of its progress results. Such a growth is isolated, biologically, from any base of operation by which a tissue remedy can exert an influence upon it, for though it is a tissue of normal resemblances, in some respects, it is growing out of place.

It seems to me that the physiological action of drugs limits their capacity to exert effects in disease. In other words, any agent capable of acting as a remedy must possess the power of specifically influencing, either through vasomotor centers or direct action upon the tissues themselves, the circulation of a given part, or through trophic nerve centers its nutrition, or by specific affinity for the cells themselves, the plastic power presiding over them.

When new growths are not isolated from the normal tissues from which they originate, but are histologically modified parts of them, or are intimately related, we may reasonably expect the tissue affinities of drugs to be exerted upon them; but when tissue grows out of place, has been transplanted, or develops an entirely new character, it is reasonable to suppose that that intimate relationship which exists between all the normal tissues has been severed, and the knife or other destructive means outside the field of therapeutics becomes the only reliable means of removal.

PAIN.

Pain is an almost inseparable symptom of disease unless there is loss of sensation in the affected part. True, the pain may not always be referable to the point of lesion, but may be reflected to a distant portion of the body. Still, a sense of local discomfort is almost invariably present, constantly or at intervals, either in the part affected, or in some locality, or localities, to which the irritation or disturbance is reflected.

Pain may be defined as an aggravated sense of discomfort, so pronounced in character as to enable the subject to locate it. Its character may vary, being in some cases dull, in others aching, sharp, burning, gnawing, stabbing, etc. It may be constant, intermittent, remittent, or erratic or changeable, as to its location. It may be so slight as to simply attract the attention of the patient to the point of attack, or so severe as to drive him frantic with suffering.

The immediate seat of pain is some portion of the sensory nerves, but the primary cause may lie outside these tissues, as, for example, in inflammation the interstitial changes may give rise to pressure or other irritation of nerve fibers, a condition demanding the removal of inflammatory hyperæmia, in order that the pain may subside. Spasmodic contraction of irritated muscles may be the cause of intense pain, from the effects of severe pressure upon branches of the afferent nerves. In other cases disturbances in the nerves themselves may be the origin of the pain, as in many cases of neuralgia from irritation of a dental pulp, or pressure upon some nerve trunk, or circulatory changes in the nerve trunks or ganglia. Impoverished conditions of the general system may give rise to pain in a nerve on account of deficient supply of nourishment to the part. Encroachment of new growths upon normal tissues may result in pressure or dragging, which may amount to severe pain. Ulceration of tissues gives rise to exposure of nerve fibers, and resultant irritation and pain.

The rational treatment of pain embraces a lengthy list of remedies, though the indolent or careless physician will expect to succeed with a very limited number, and of these opium, or its preparations, will constitute the principal resource.

These remedies may be divided into general and spe-

cial. General remedies are those which exert a controlling influence over the general circulation, especially in the nervous tissues, as aconite, or such as add to the nutritional power there, as phosphorus, magnesium, or potassium phosphate, or such remedies as stimulate the circulation in the part, as arsenic. Special remedies are those which, acting through their tissue affinities, impress local regions specifically, to influence circulatory lesions, relax morbid spasm, control irritation, or improve nutrition, in special nerve fibers.

The most satisfactory method of studying this subject is to formulate pain expressions with their specific remedies:—

Aural pain (earache) calls for chamomilla, piper methysticum, pulsatilla, verbasum thapsus (oil of).

Cardiac pain calls for nitrite of amyl, if from angina pectoris; in cardiac rheumatism, antipyrin; cimicifuga, caulophyllin, jaborandi, the salicylates, etc. Cardiac neuralgia may call for magnesium phos.

Cacal pain calls for lachesis.

Cerebral pain of full, throbbing character calls for nitrite of amyl, nitro-glycerine, antifebrin, or antipyrin. When more than evanescent in its continuation, aconite and gelseminum.

Cerebral pain of dull character, with facial pallor and coldness of the extremities, belladonna or ustilago maidis.

Cutaneous pain, burning, with stinging and pungent heat, apis, citric acid (locally), rhus tox.

Enteric pain (colic), griping, twisting, about and above the navel, colocynth, dioscorea; in dysentery or cholera infantum, ipecac should be alternated with the one chosen. The pain of winter diarrhea calls for potassium bichromate 2x. In muco-enteritis, epilobium should not be forgotten. Pain in the hypogastric region, when intestinal in origin, calls for collinsonia.

Facial pain (*Tic doloieux*) calls for piper methysticum.

Gastric pain calls for *cimicifuga* or *caulophyllin*, if muscular in character; gastric neuralgia, antipyrin, colocyath, magnesium phos., *pulsatilla*.

Hepatic pain calls for *bryonia*, *chelidonium*, *colocyath*. Biliary colic (gall-stone spasm), benzoate of lithium, olive oil, salol.

Muscular pain, dull, aching, without swelling of parts, calls for full doses of *cimicifuga* (a decoction is the most reliable, in tablespoonful doses).

Muscular pain, full, tense, severe (parts swollen), great aggravation upon the least motion, *jaborandi* (full doses of the green preparation—specific medicine). This is the most reliable remedy in inflammatory rheumatism, administered until its inhibitory effect is marked by cool, clammy skin.

Muscular pain, sharp and lancinating at times, erratic, shifting suddenly, antipyrin; give five-grain doses every four hours until better.

Myalgia (pain in the muscles on motion with relief upon rest), chronic, *hydrastis canadensis* (minute doses).

Neuralgic pains (at large) in anemic, ill-nourished subjects, without threatened change of structure, phosphorus. If there is loss of memory, occasional aberration, and other symptoms of pending organic change, potassium phos. Darting, stitching pains, in such cases, may be more speedily benefited by the addition of magnesium phos.

Occipital pain extending from the shoulders and neck, sticta.—*Scudder*.

Odontalgia (toothache) calls for *aconite*, *plantago major*, *piper methysticum*. An exposed pulp or diseased fang will demand operative interference.

Orchialgia (pain in the testicle) calls for *cimicifuga*, if the patient is of rheumatic diathesis and the case is chronic, or *sabal serrulata*, when there is prostatic irri-

tation or sexual neurasthenia; pulsatilla, if acute inflammation exists.

Ovarialgia (pain in the ovary), cimicifuga, hamamelis, lilium tigrinum, ustilago, valerinate of zinc.

Pericranial pain, antipyrin, cimicifuga, faradism, salicylic acid.

Periosteal pain calls for chloride of gold, iodide of potassium, manganese, silica.

Rectal pain calls for æsculus, when sharp and cutting, with distress in the sacral region; collinsonia, when the rectal pain is complicated with pain in the hypogastric region; hamamelis, when there is marked local sense of fullness and weight.

Sciatica, when radiating about the hip joint, colocynth; when the entire nerve is involved, the sulphur pack, salol, the faradic current, downward.

Spinal pain, severe and *drawing*, with contraction of the dorsal muscles (spinal meningitis), jaborandi.

Splenic pain calls for carduus marianus, ceanothus Americanus, grindelia squarrosa, or polymnia uvedalia.

Thoracic pain (pleurodynia) calls for bryonia, cimicifuga, caulophyllin. The agonizing pain of pleuritis calls for nauseating doses of lobelia (a decoction of the fresh plant or saturated tincture of the seed).

Uterine pain (dysmenorrhea) calls for antipyrin, cimicifuga, leontin, pulsatilla, viburnum prunifolium.

Vaginal, stitching, sense of weight, dyspreunia, sepia.

Vesical pain calls for eryngium aquaticum, rhus aromatica; if prostatic irritation exists, sabal serrulata, staphisagria.

But therapeutics are not yet so perfected that narcotics can always be wholly dispensed with. Morphia and the other preparations of opium are sometimes valuable means to resort to, as well as chloral, ether, chloroform, etc.

THE SCIENCE AND ART OF PRESCRIBING.

Consideration of certain subjects included under this heading is as important as the principles of selection, in order that success may attend the efforts of the therapist.

The adaptation of the remedy may be correctly made and yet treatment prove a failure, because the drug lacks its proper medicinal virtue; quality of drug then is an important consideration. Or, the dose may be so large that dynamical effect is embarrassed and the function sought to be improved unpleasantly disturbed; or the dose may be so small as to fail in producing the necessary amount of disturbance requisite for a salutary effect; or, possibly, the drug may have been administered at the wrong time to produce the desired result, or it may have been given in combination with such agents as interfered with its proper action (incompatibles).

The convenience of the prescriber is also to be taken into account, as regards the portableness of his medicines, if he be so situated that it becomes necessary for him to carry them. This will lead to the consideration of bulk, form for administration, etc.

THE QUALITY OF DRUGS.

The reader will agree with me that in the matter of drugs, as well as in many other respects, there is very little in a name. A number of years ago, while practicing in Missouri, I needed some gelseminum, and desired it very much. My vial of special preparation was exhausted, and the only recourse was to apply at the village drug store. Sure enough, the apothecary had "Tinct. Gelseminum," duly labeled, on his shelves, and an ounce was procured, and the remedy administered, but with no response. A larger dose was given, but still no effect was

manifest, and I found, upon actual trial, that a full tea-spoonful failed to produce any of the influence of active tincture of gelseminum.

The tincture had been made, as I learned subsequently, of a dried root of which the druggist could afford no idea of the age. It had been in his own shop several years at least before the tincture was prepared. This is a single instance of a great number of unsatisfactory results which have followed the administration of drugs of questionable source within the past twenty years, and I am confident my experience has been but a parallel to that of the majority of physicians.

We become after a time, distrustful of a remedy unless we know the source is reliable. The assurance of the druggist as to the qualities of a drug, amounts to little, for he is usually unqualified, except to declare that the processes of manufacture have been legitimately carried out. No one not positively knowing the age of the crude material, is competent to say that a pharmaceutical preparation contains the active principles of the drug it represents, unless the material is of an imperishable character, and this cannot be said of crude organic products.

There is no wonder that the average "regular" has so little faith in indigenous remedies—that he confines himself to a very small group of agents, and these principally chemicals of the kind that cannot deteriorate with age. Who has not whiffed the musty odors of an old-fashioned blue-pill doctor-shop? The most unreliable place in the world to purchase a preparation of a vegetable remedy, is a drug store patronized exclusively by "regular" physicians. Go to such a place and order tincture of aconite or cimicifuga, or any other tincture of a perishable article, and you may get a good drug, and you may not; the chances are you will be disappointed.

The stuff may have the color, the odor, and, possibly,

the taste, but the probabilities are that your patient will fail to improve under its influence, as you have a right to expect. The material was old and musty, perhaps, before the tincture was made, and was as innocent of medicinal principle as the most inert substance in the world, or, possibly, the tincture may have been made of a poor fluid extract, by adding one part to fifteen of alcohol.

I may be late in the day in making these accusations. Old-school physicians near the centers of medical learning are waking up to the importance of reliable drugs, but the country cousin is still a hundred years behind the times in this respect.

The successful practitioner of medicine is on the alert to know what *quality* of remedy his patient is taking. He realizes the unreliability of the general drug market, in many respects, and demands that his prescriptions shall be filled with the preparations of some well-known, well-tried, and reliable firm. There are a number of these houses in the United States, and preparations bearing their labels, if genuine, may be depended upon.

Among these it affords us pleasure to mention Lloyd Brothers, of Cincinnati, Parke, Davis & Co., of Detroit, and Eli Lilly & Co., of Indianapolis. The Specific Medicines are always reliable and have contributed a large share toward the success achieved by our school in recent times. The Normal Liquids are also worthy of special mention.

Druggists are usually honest; however, sometimes we may reasonably suspect they have substituted their own or some other cheap article. When there is the least ground for suspicion that the best of drugs are not supplied, the physician will save credit to himself and confer a favor upon his patrons, by keeping his own medicines in stock and dispensing them when needed.

There is a class of supplies which are imperishable, as

the vegetable alkaloids, mineral salts, etc., but these, if expensive, may have been adulterated until a given quantity represents less than half the ordinary strength.

I have never found any of the vegetable remedies in a more reliable form than a tincture prepared from the fresh material in the proportion of a pound of the crude article to the pint of menstruum, bruised and covered with alcohol the same day it is gathered. This represents the most refined pharmacy, for it succeeds in preserving the property of the agent complete, without permitting the escape of any of the volatile principles—something sure to occur if the agent be dried and stored for even a brief space of time. Some agents deteriorate materially, even during the short process of drying. In a country practice of fourteen years, where indigenous remedies were numerous and abundant, I prepared many of my medicines in this manner, and was never disappointed in the effects of a drug thus obtained.

In gathering plants for medicinal purposes, it should be borne in mind that the most vigorous, healthy ones should be selected from situations in which they tend to grow spontaneously. Wild plants are better than cultivated ones, for they select a spot best adapted to a full development of all their qualities. A plant which flourishes best in a bright, sunny place on dry ground, should not be employed if found in a damp, shady spot. Neither should they be gathered when wet with rain or dew, but under the sunshine, when rays of light are contributing to active changes in their tissues. During blossoming-time the plant contains the most active qualities. Flowers should be gathered as soon as they open; berries, fruits, and seeds, when fully ripe; bulbs, as soon as mature, and the leaves begin to decay; barks, late in the autumn; roots of perennial plants, in the autumn after the leaves have fallen, or in the spring before they start; those from

biennials, in the spring or fall of the second year; from annuals, just before the seeds ripen.

The great point to be impressed is the necessity of caution against the obtaining of a poor agent. When the medical profession becomes completely and fully awake on this subject—and it is no new one—there will be no demand for poor drugs, no opportunity for their substitution, and they will not be in the market. But as long as a certain class of practitioners administer huge doses of crude drugs to their patients, without stopping to inquire as to their quality, so long those who follow more of a system of refinement in therapeutics must be on their guard against unreliable preparations.

FORM FOR ADMINISTRATION.

This is an important consideration if we expect success to follow our efforts; for remedies should be taken promptly and regularly, in order to fulfill our expectations, when we prescribe them.

Some patients cannot take a pill or capsule, some can take a capsule but not a pill, and *vice versa*; others cannot take medicine in solid form at all, and demand that every medicine shall be fluid, while others prefer powders.

Then comes the question of pleasant medicines. The agent must be pleasing to the eye, unobjectionable to the taste, effective in quality, and somewhat concentrated as to quantity of dose.

Besides these considerations, the physician's convenience must sometimes be consulted. If he is doing an office practice in a city, where himself and patients are convenient to numerous pharmacies, he can prescribe or administer to suit, perhaps, the caprice of all concerned, but if his practice call him far from his office over such roads as demand equitation for ready travel, his medicines, in order that he may carry a variety, must be concentrated, and in such form as to avoid loss or injury to

other contents of his case, if a vial should become uncorked or be broken by the jolting. In such an instance, solids will be the most desirable form.

Professor Scudder in his "Specific Medication" recommends the carrying of fluids (specific medicines), to be dispensed in water, a few drops of the appropriate remedy to be added to half a glass, or four ounces, of the vehicle, so that a teaspoonful shall be the regulation dose; and this is an admirable form, in acute practice, for a large number of remedies may thus be conveniently carried,—sufficient for an extensive practice, without need of frequent refilling.

But in chronic practice, this method has its objections. In a warm atmosphere, an organic medicine soon undergoes fermentive change when so highly diluted, and in order to keep the remedy constantly up to the standard, it should be prepared each day. This involves much trouble and expense, and soon puts the practitioner to his wits to devise a means by which his patient can be supplied with remedies which will remain in perfect state until the entire prescription has been taken.

Water will still constitute the bulk of the vehicle, if the medicine is to be fluid in form, but after the active agent or agents, something unobjectionable as a preservative must be added. What shall this be, alcohol? No. Syrup? No, these are abominations, in the majority of cases.

Glycerine is the best agent for this purpose, from twenty-five to fifty per cent of the bulk of the vehicle, according to circumstances, serving to preserve a mixture, and often, at the same time, to enhance its effect. Glycerine possesses rare virtues in the correction of fermentive states of the alimentary canal, promoting, as well, normal peristaltic action.

I would recommend then in the prescribing of fluid

medicines, unless the patient is to be visited daily and the remedy as regularly renewed, that such a preservative constitute a part of each prescription.

For example:—

℞ Phytolacca (s. m.), f3ss.
 Glycerine, f5j.
 Water, add to f3iv.

In the sea-coast atmosphere of California, this formula will remain unchanged for a week, though if the temperature be considerably higher in other parts than there during the summer, the amount of glycerine should be increased from one, to two fluidounces.

Inorganic substances administered in solution, if not combined with organic principles will not ferment, and need only the solvent; and if this be simple water, it is sufficient.

Another elegant form for the administration of medicines is one which commends itself for the reason that children, and some adults whose palates are easily offended by remedies in other forms, receive them kindly, while they may, at the same time, represent all the medicinal principles requisite, in a small quantity. I refer to *triturations*.

Thorough subdivision of the particles of any agent without doubt promotes its ready absorption, and the full display of its properties. If it be an agent of powerful nature, its thorough incorporation with some bland vehicle is an excellent manner of putting it in shape for convenience and safe dosage, rendering accidental poisoning from the pocket-case out of the question. Triturations, moreover, are elegant preparations. They may be carried without danger of soiling the pocket-case or pocket. They are clean, attractive, and pleasant to the taste, and in this day, when offense to the palate must be avoided

as well as disease removed, this is no small matter. Triturations are convenient for office dispensing, also, and at the same time they save much trouble in keeping on hand a stock of vials, to say nothing of the expense.

I do not believe that trituration adds anything to the drug in the way of dynamization, except the advantage of divisibility. The old homeopaths believed that every turn of the pestle imparted a new property to the agent, and that it acquired new potency as it was carried higher in the scale. But this doctrine has fallen through; is scouted by the most earnest and sensible men in the homeopathic school. Hahnemann doubtless contained in his composition more or less of a tendency to superstitious credulity—nothing to be wondered at considering his time.

Schussler, in his work on the "Biochemic Treatment of Disease," suggests that tissue remedies may be so finely subdivided by trituration, as to be taken up by the nerve-sheaths of the sympathetic, which ramify through the mucous membrane of the mouth and upper part of the throat, and, proceeding to the nearest ganglia, distributed to the diseased tissues through radiating branches, without entering the general circulation, at least a certain portion, more rapidly and directly than would be the case if first taken into the blood.

Rejecting all theories as regards any additional property to be derived from the process, except that of convenience, we may consider this sufficient to warrant the use of triturations in a large number of cases, and believe those of our readers who are not informed as to the manner of preparing them should know something about it; for while it may be more satisfactory to purchase them from a pharmacist, this is not always convenient, and it saves considerable expense to prepare the trituration needed, from the potency next below in the scale. Rural

practitioners, especially, will find it convenient to be fitted to prepare their own triturations, for valuable time is sometimes consumed while waiting for the shipment of a package from the city, and this class of agents cannot be found in many places outside the commercial centers.

I do not believe that mathematical precision is essential to the successful use of a trituration. No doubt the one-ninety-ninth of a grain of a drug would produce very nearly or quite the same effect as the one-hundredth of a grain of the same agent; or perhaps the nine hundred and ninety-ninth nearly or quite the same effect as the one-thousandth. Perhaps too much stress has been laid upon these matters, and that this tends to bring ridicule upon the whole process. The object being to render the dose sufficiently minute to produce the desired effect, without disturbing the economy or part unpleasantly, we might employ some other scale of division besides the centesimal or decimal, but these are convenient, and not objectionable to any genuine Eclectic because they have been employed by the homeopaths.

Hahnemann's method of triturating remedies consists, in his own words, as follows:—

“Of the pulverized substance you take one grain; mercury may be used in the liquid state; of petroleum you take one drop, instead of one grain put this grain; into an unglazed porcelain mortar; then you take thirty-three grains of sugar of milk and mix them with the drug by triturating the mass with some force for about six minutes by means of a porcelain pestle. Before you triturate stir the mass for a little while with a spatula. Having triturated the mass, you stir it again for about four minutes, scraping up that part which covers the bottom of the porcelain mortar, and also that which adheres to the pestle; then you triturate again with greater force for

six minutes, without, however, adding anything new. This mass you scrape up again for four minutes, add another thirty-three grains of sugar of milk, stir the new compound for a while with the spatula, then triturate it for six minutes; scrape it up for four minutes; triturate it again with great force for six minutes; scrape the mass up again for four minutes; then add the last thirty-three grains of sugar of milk, and with this last added portion proceed as with the two former. This powder you inclose in a well-corked glass, and mark it with the name of the substance and the figure 100, to show that this is the one-hundredth potency of the drug."

Some of the directions here seem needless, technical, and even whimsical, and without doubt are unnecessary for the preparing of a good trituration. The founder of homeopathy wished, probably, to guard against careless and slovenly manipulation, and the consequent presence of particles of the crude material in the preparation, but this can be effected without devoting exactly four minutes to stirring and scraping and six minutes to trituration for two consecutive periods, after the addition of each third of the bulk of sugar of milk. Still, thirty-six minutes is not too much time to devote to the preparation of a trituration. Less would not insure thorough subdivision and incorporation. Where time is plenty an hour might well be occupied with each one.

The decimal scale is the one commonly employed at the present day in preparing triturations. One part by weight of the crude drug to nine of sugar of milk thoroughly triturated, constitutes the first decimal; marked thus: 1x; one part of the first to nine of sugar of milk, the second decimal, marked thus: 2x; one part of the second to nine of sugar of milk, the third decimal, marked thus: 3x; and so on as high as it is desired to go.

If the quantity to be triturated was large, it would be

well to add a third of the sugar of milk at a time, triturating after each addition for ten or fifteen minutes, according to the motion of the manipulator. Some persons will accomplish more in six minutes than others in fifteen, depending upon the amount of energy or the tension of the nervous system of the triturator.

After the first trituration, it is not necessary to weigh the ingredients for the higher preparations. These may be measured in a small graduated medicine tumbler or in a teaspoon near enough for all practical purposes. As we have already stated, mathematical precision is not important, so that there be something of a uniformity in the size of the dose, and it be minute enough to disturb molecular action in the diseased organism kindly.

I would take, then, say a teaspoonful of the trituration to be carried up a step in the scale, put it in a clean mortar and add nine teaspoonfuls of the sugar of milk or other vehicle and triturate for thirty or forty minutes, scraping the sides of the mortar and the pestle frequently during the time; or, to insure more complete divisibility and incorporation, we may add three teaspoonfuls of the vehicle to the first spoonful and triturate for a few minutes—ten or fifteen—then again add three teaspoonfuls of the vehicle, again triturate, and thus continue until the nine have been added. At the end of this time the question will arise, Which insures the best trituration? Solve it if you can and take your choice.

Sugar of milk is the vehicle usually employed for carrying drugs up through these processes. It possesses enough of the cohesive property to render it convenient for dispensing, is inert except as regards its nutritive properties, which are not objectionable, and pleasant to the taste. But sometimes it is not convenient for rural practitioners to obtain this article, and some more common vehicle must be employed. Cane-sugar would

answer this purpose were it not that it absorbs a modicum of moisture from the atmosphere, and when the physician needs his trituration for use, it may be found adhered into a firm mass. This objection may be easily remedied, however, by the addition of half as much powdered starch by bulk or weight. Powdered saccharum album and culinary or laundry starch are combined in these proportions and thoroughly incorporated. To accomplish thorough mixing, the articles may be put into the mortar and trituated—thereafter to be placed in a jar for future use as a vehicle.

I would not advise the reader to begin with the crude drug and carry it up if he can obtain a lower trituration of the desired agent with little trouble. These preparations are expensive when purchased at a pharmacy, but the accumulation of packages of the different attenuations, to say nothing of the labor, would be enormous if many were used and each one were brought up through a number of steps. The preferable plan is the purchase of an ounce of the trituration next lower than that usually employed, and when the supply jar becomes exhausted, it can be replenished by carrying a teaspoonful of the lower attenuation up one step.

There is no call for straining a point by devoting a mortar and pestle to each drug. Pharmacists would fain have us believe that the preparation of these articles calls for an expensive paraphernalia. Water, if properly and rationally applied, and a clean drying cloth be used, will cleanse the single mortar effectively after the preparation of each trituration. The mortar and pestle should be proportionate in size, the mortar being large enough to contain the mixture safe from spilling when the pestle is vigorously manipulated.

Fluid medicines may be trituated by adding a fluid-drachm of the liquid to nine of sugar of milk for the first

and proceeding with the result, as in other instances. The first trituration may be pasty at first, but it will soon become dry and pulverized, after it has been scraped down a few times. Fluid medicines, however, are usually attenuated by dilution more satisfactorily than by trituration.

Dilutions are the same class of preparations as triturations (attenuations), only they consist of the reduction of the active principle in fluid form, alcohol usually constituting the vehicle,—the first decimal dilution consisting of one part of the remedy to nine parts of alcohol, mixed and well shaken; the second of one part of the first to nine of alcohol, well shaken, etc.

I find some of the specific medicines too concentrated to be satisfactorily dispensed to children in the full strength, even when largely diluted with water. I have known several cases of poisoning in infants with aconite administered in this form. Five drops of the specific medicine in four ounces of water are amply sufficient for an adult if a teaspoonful be given every hour, and if one is preparing the mixture for an infant, one drop is fully enough; if by accident several drops go over the lip of the vial instead, there is danger in the dose. For infants, then, and even for general prescribing, the first dilution of Lloyd's aconite is preferable to the original form, for the same manner of use. The toxic effects of belladonna are also often developed from the specific medicine. This may be said to its credit, for it demonstrates the sterling quality of the drug; but a much more satisfactory action (dynamical), may be obtained from the third dilution. Colocynth exhibits all its admirable qualities as a reliever of abdominal neurosis, when half a teaspoonful, or less, of the third dilution is added to half a glass of water (four ounces), and teaspoonful doses are administered; and the bitter taste is gone. These, with tincture of phos-

phorus, nitro-glycerine, tincture of copper, and a few others, about comprise the list of specific medicines which require dilution, before dispensing after Professor Scudder's plan.

Crude drugs to be administered in solid form may now, thanks to one of the triumphs of modern pharmacy, be concealed in capsules, so that the most nauseous agent may be taken without discomfort, if the patient is able to swallow a bolus. Alstonia, quinia, sulphite of sodium, solid extracts, etc., may be introduced into capsules, of which a number of sizes are manufactured, and thus dispensed without fear of rejection by the patient, because of objectionable taste. These articles are cheap, and should be part of the dispensing stock of every physician.

THE QUESTION OF DOSE.

This subject has been a much discussed topic during many of the past years of medical history. Since the advent of Hahnemann, with his attenuations, the medical world has been largely divided into two factions, representing respectively the large, and the small dose.

Dynamical therapeutics have little room for the large dose. If we desire to antidote a poison, expel a parasite, or relieve an excessively painful sensation, we may employ medicine in such quantities as to arrest or disturb function, for a time, with beneficial effect; but we cannot expect natural processes to be subserved while the agent is passing through its active influence in the system. Instead, there is likely to follow more or less debility of certain parts principally affected, even though the desired result be attained.

The nature of a drug must determine, to a certain extent, its dynamical dose. Some drugs are so powerfully toxic in material doses, that therapeutic effect can only be expected when minute quantities are administered. Aconite, bromine, bichromate of potassium, and iodine, may

be named as examples. Others seem to act equally well in attenuations or in crude doses, as, for instance, calcium sulphide.

There is a certain range within which it might be a question as to what constituted the proper quantity, and we find here the individuality of the physician asserting itself. Possibly one physician affords his female patient as much benefit in a case of pelvic weight and discomfort with the 3x of sepia, as his neighbor does with the 10x, and, probably, has no better success. In either case there is not enough of the agent exhibited to prove an unpleasant disturber, when its specific affinities are manifested, and in both cases dynamical therapeutic results follow.

Though the question of minute dose continually grows more acceptable to a larger number of physicians, there is always so much difficulty in accepting the proposition of attenuation,—except in the case of born and bred homeopaths—that a few illustrations may profitably be offered as to the materialism of highly attenuated medicines. The microscope under a power of three hundred diameters has detected particles of medicine in the 10x and 11x, in triturations and the spectroscope has done as much in case of dilutions

But let the sceptical one take crude sepia (India ink), and carry it up through the ascending grade, and he needs no optical apparatus to convince him of the presence of the active agent, after a number of steps have been taken. The first trituration representing nine parts of a perfectly white substance (sugar of milk), to one of the active agent is almost black, the second is brown, and the third still affords an unmistakable evidence of the presence of coloring material, and, by comparing the fourth with pure sugar of milk it needs no logic to convince one that a slightly darker tint exists in the trituration, of which one

ten-thousandth portion only, is represented by the crude drug.

But the human organism is delicately sensitive to the action of minute quantities of drugs; this seems the most difficult of comprehension. A minute dose produces no change with the healthy person, for the impression made is so slight as to be incapable of causing deviations in normal processes; however, in disease, the debilitated or disordered functions are nevertheless prompted by such quantity, and restoration follows.

Clinical experience, then, is of more value in the determination of dose than all the theory or scientific investigation that can be made.

Some persons are extremely susceptible to the action of a medicine that can be tolerated by others in much larger doses. Many Eclectics use the one-per-cent solution of nitro-glycerine habitually, and it does very well as a rule, but I have produced severe aggravation of a throbbing headache with the 3x, which would represent the one tenth per cent; this patient complained of severe cerebral throbbing when a teaspoonful of the 5x was added to a wineglassful of water, and a teaspoonful given every two hours.

I believe that the majority of fluids requiring attenuation act as well in the third decimal dilution as higher, and I prefer the majority of our indigenous remedies in the form of specific medicines, simply diluted in water. But certain mineral agents, as arsenic, antimony, mercury, etc., should not be administered in lower attenuations than the 2x or 3x, and some animal substances, as oyster-shell, act well in high, as well as low, attenuations. Lachesis and other serpent poisons should be highly attenuated.

Unfortunately, the tendency has been to assume exclusive positions upon this subject instead of taking the middle ground and recognizing the benefit of both the large

and the small dose, as demanded by the appropriate occasion.

THE SINGLE REMEDY VERSUS COMBINATIONS.

The practice of administering but one remedy at a time possesses its advantages in certain respects, while that of combinations may also put in claims for recognition. The worst that may be said of either practice, is, that it has been abused. No one but the strictest Hahnemanian adheres to the single remedy usage; many avowed homeopaths not only alternate single remedies but combine them in the same dose as well.

The use of single drugs does more to develop their clinical properties than combinations, for when benefit follows promptly upon the administration of the single remedy there can be no question as to what has done the work; there is no disputing the fact, that we can thank homeopathy for much valuable therapeutic knowledge thus obtained. But two drugs may be needed at the same time, and may operate in distinctly separate fields, each one accomplishing its special mission, and each one being urgently required by the exigencies of the case.

To illustrate this, let us take a case of acute pharyngitis: We have here a local inflammatory condition, marked by general, as well as local disturbance. The general disturbance consists of an acceleration of the general blood stream, with increased rate of pulse, arrested secretion, headache, nervous irritability, muscular pain, etc., calling for a remedy which will specifically influence the vaso-motor centers controlling the general circulation. Sedation of this general vascular disturbance is an important indication to fulfill, and one of the special sedatives (usually aconite), the appropriate remedy. But there is a localized area concerned in this case which, though influenced along with the general circulation by the sedatives, is more specifically controlled by

a remedy (phytolacca), which does not exert any influence over the general circulation.

In order to derive all the benefit possible from a prescription, in such a case, then, the two agents must either be administered in alternation or combined in the one mixture; and as clinical experience has proven that they act as well in combination, it is convenient in many ways to unite them. The following combination proves more satisfactory than any single agent in such a case:—

℞ Aconite (s. m.), gtt. v.
 Phytolacca (s. m.), fʒss.
 Water, add to fʒiv.

Suppose we take a case of acute mucoenteritis as another example: Here we have again the general vascular disturbance to be met by the appropriate sedative, and the local vascular area, amenable to the influence of the more specific agent (ipecac), but the element, pain, may be so prominent a feature in this case that even a third remedy more adapted to the neurotic phase may be added with advantage, and colocynth can become a helpful agent in the combination. Thus:—

℞ Aconite (s. m.) gtt. v.
 Ipecac (s. m.), gtt. xv.
 Colocynth (s. m.), gtt. iii.
 Water, add to fʒiv.

The only objection that can be urged against combinations, unless they are carried into the extreme of empirical shot-gun prescribing, is that of incompatibility. Of such errors there is little danger, with the small dose and specific adaptation of dynamical therapeutics. However, a brief notice of this subject is worthy our attention.

Incompatibility of drugs may be considered under three separate heads: (1) Chemical, (2) therapeutical, and (3) pharmaceutical.

Chemical incompatibility may result unfavorably when

the combined agents react upon each other to form new compounds, which may render the active principles either insoluble or of such form as to divert the combination from its objective point as a therapeutic agent. Phosphoric acid and quinine united in a vehicle form phosphate of quinia, an insoluble compound which becoming precipitated, forms an unsightly mixture, and unless the vial be well shaken at each time of taking, the therapeutic properties are left behind until the contents are nearly exhausted, to then appear in exorbitant doses. The combination of two salts may result in exchange of their radicals and the formation of new salts, when combined in a solution; such agents, if more than one be administered at a time, should be given in alternation. Acids and chemical bases when united result in the formation of salts, and should not be joined in a prescription unless the preparation of a salt is intended. Borates, carbonates, hydrates, phosphates, and tannates of alkalis and minerals, are liable to result if caution and discrimination be not exercised in the combining of them. Lime unites readily with the atoms of carbonic acid of many carbonates to form an insoluble precipitate. Other examples might be offered but are hardly necessary in a work of this character.

Therapeutic incompatibility implies antagonistic action on the part of two agents in the system when administered at the same time, though there may be no chemical incompatibility prior to administration. Certain drugs interfere with the action of certain others without doubt. Atropia and sulphate of morphia are antagonistic, the one antidoting the action of the other, a fact worthy of recognition in case of poisoning by either agent. Calabar bean and belladonna, and jaborandi and belladonna are other instances. It has been asserted by some that the prescribing of belladonna and gelsemium at the same

time is unscientific, for the reason that they are indicated in opposite states of circulatory disturbance. But while there are few cases where both remedies would be indicated at the same time, the fact that each remedy, so far as the circulation is concerned, spends its therapeutic force upon a different part—each acting in a different line, the one upon the heart and arteries, the other upon the capillaries, would go to gainsay such a proposition. *Gelsemium* is usually indicated in *sthenia*, with full, bounding pulse; *belladonna* in *asthenia*, with feeble, compressible pulse; but this need not indicate that the one would antidote the influence of the other if both were administered at once.

A general knowledge of the physiological action of drugs—an important need in the education of every therapist, will usually enable the practitioner to avoid therapeutic incompatibles.

Pharmaceutical incompatibility will not trouble us much, as we do not propose to deal largely with polypharmacy. Mixtures of iron and vegetable extracts result in inky compounds, formed by the precipitation of tannates. Iodide of potassium decomposes many—in fact nearly all metallic salts,—and corrosive sublimate is decomposed by association with almost any other agent (a fact not highly important here, but mentioned incidentally). Certain agents are powerful oxidizers, as chlorate of potassium, nitric, and nitro-hydrochloric acids. Sugar, the oils, ethers, phosphorus, and glycerine, being readily oxidizable, should not be indiscriminately mixed with such substances for fear of an explosion, to say the least. Almost every physician's visiting list contains a catalogue of incompatibles, which will be found valuable for study during spare moments, if his predilections are in the direction of indiscriminate mixing.

There are often instances where the single agent acts

with more positiveness than if combined with another. Given, a case of laryngeal irritation with *hoarseness* as a leading characteristic, and potassium bichromate 2x or 3x, acts more promptly than any combination can, in effecting a cure. Given, a case of spasmodic cough, especially pertussis, and *drosera* excels the most approved combination. Given, a case of capillary bronchitis, with subcrepitant ronchi, and suffocative cough, with evident oppression of the respiratory center, and tartar emetic 2x will produce more prompt and pleasing effect than all combinations ever tried.

In conclusion, then, it may be written, that two or three remedies may be advantageously combined when there is offered for each, in a given case, a separate field for action. When such fields are not offered, the single remedy will be more scientific and more satisfactory.

It may be added, that, as a general rule, no combination should contain more than one mineral agent, if intended for internal administration. It would be better to make it a rule to always administer mineral agents singly, and in alternation with other remedies, if the case calls for any further medication.

TIME OF ADMINISTRATION.

The time of administering medicines is worthy a few moments' thought, for in some cases it is of considerable importance. For instance: Vermifuge agents may entirely fail of the desired effect if taken while the stomach contains food, or immediately before eating; an antiperiodic administered so that its effect has passed off before the time of exacerbation affords unsatisfactory results, failing, usually, to interrupt the periodicity. Some remedies prove irritating to the stomach when taken before meals or when the organ is empty, and require to be taken after meals; such is the case with cod-liver oil, *alstonia*, and some other remedies.

The administration of minute doses of medicine, in acute disease (and this is usually the preferable plan), comprehends a frequent repetition of the dose. The sedative mixtures of aconite, gelseminum, veratrum, jaborandi, etc., (a few drops of the remedy in four fluid-ounces of water, the dose being a teaspoonful), should be administered every hour to maintain a constant influence over the circulation and eventually bring it under control. Minute doses of ipecac, lobelia, nitrate of sanguinarina, tartar emetic, etc., administered to control pulmonary irritation giving rise to cough, should be taken every two hours, at the most, for the philosophy of the small dose is its direct action continually impressed, against that of the large dose, spasmodically disturbing a part in an unpleasant manner.

In chronic disease, even when we rely upon the minute dose, frequency of repetition is not so important; interstitial changes do not require such frequent prompting as circulatory changes, or, perhaps, it might be better stated that drugs which specifically impress interstitial or cellular changes are not so speedy in action nor so evanescent in their influence, as those which are adapted to disturbances of the circulatory system.

In chronic disease, then, three or four doses in twenty-four hours answer as good, if not a better purpose, than more frequent repetition. The therapeutic effect in chronic disease must be the gently persuasive, not the radically coerceive one.

PRESCRIPTION WRITING.

The wise physician will dispense his own medicines, as a general rule. However, there will occur numerous instances in which it will be more convenient to send the patient to the druggist, and the observance of a certain decency in the matter of inditing the billet which calls for the remedy or formula required, is worthy of observance.

There are numerous reasons why a prescription should be unintelligible to certain patients. Could we always deal with educated and intelligent persons, it might be different, but with many, a common remedy called for by its common name would not be considered worth the taking, or a remedy which is poisonous in large doses, if prescribed even in highly attenuated ones, would be sufficient to frighten some into discarding their physician for prescribing such an agent; therefore it would be better to disguise a knowledge of the character of such medicine from the patient.

A few physicians pride themselves upon their dog-Latin—for few employ anything better than a mere smattering of knowledge of the Latin language,—and make it a point to criticize and ridicule the prescriptions of less pretentious competitors, who perhaps may excel them in the real science of therapeutics. This is an additional reason why prescription writing should receive some attention from every practitioner, even though he may not practice polypharmacy, or follow the habit of sending every patient to the druggist for a bottle of nauseous compound.

Physicians who write faultlessly correct Latin prescriptions are few, and far between. Latin is a study demanding a great deal of close application for its complete mastery. Its numerous complicated declensions and conjugations, with their rules and exceptions, are calculated to muddle the brains of those who do not devote much labor to them. The majority of pretended Latin prescribers might find it difficult to write even a correct English prescription, and if they possess a little knowledge of some of the rudiments of Latin they are among the favored few; but the majority are liable to many stumbles and blunders which, if their work were criticised by competent judges, would readily appear.

Modern prescription writing has established the custom of semi-Anglicising and abbreviating, so that many tough problems are slidden over with a tolerable show of scholarly skill; and this is all very well, for why should a dead language be perpetuated at needless expenditure of labor, when medicine presents so many more-important subjects, to demand unceasing application for their successful study?

Every prescription may be divided into four parts: (1) The *superscription*; (2), the *inscription*; (3) the *subscription*; and (4) the *signature*. In some cases the subscription is joined to the inscription so that these parts are not distinctly set forth. An illustration of this deviation will be given shortly.

The *superscription* universally employed is the symbol \mathcal{R} (which is not an abbreviation and requires no period). It is formed from the union of the first letter of the Latin verb *Recipio* and the sign \mathcal{J} (used as an invocation to a supernatural power by the ancients). This occupies the left hand corner of the prescription and literally signifies Recipe, the imperative mood, second person, singular number, of *Recipio* (I take), and literally signifies, "Do thou take." It is directed to the one who compounds the mixture.

The *inscription* consists of the body of the prescription, containing the names of the ingredients, and the amount to be employed of each, in drops or grains, drachms, etc.

The *subscription* indicates the form the mixture is to assume; as, if the ingredients are fluid, the abbreviation, M. If the ingredients are solid and in the form of powder, the abbreviations M., ft., chart., no., etc., indicating the number of powders or papers the mixture is divided into, are employed.

The *signature* contains the directions with regard to the administration of the medicine, and the prescriber's name.

It is preceded by the abbreviation S. or Sig., which signifies literally, "Write thou."—the writing to be done upon the label of the vial or wrapper containing the medicine after it has been compounded.

For example:—

<i>Superscription.</i>	℞	
<i>Inscription.</i>		{ Quiniae sulph., gr. xv. Glycyrrhizæ, pulv., gr. xxx.
<i>Subscription.</i>		{ M. (or Misce, Mix), et ft. (or fiat), pulveres numero xv (and make fifteen powders).
<i>Signature.</i>		{ S. (Sig., or Signa).—Take a powder before each meal. John Doe, M. D.

The combination of the inscription and subscription may be illustrated as follows:—

<i>Superscription.</i>	℞	
<i>Inscription and subscription.</i>		{ Piscidiæ erythrinæ (s. m.), f̄ȝi. Glycerini, q. s. ad f̄ȝii.
<i>Signature.</i>		{ S.—Take a teaspoonful every two hours until sleep follows. A. Watson, M. D.

The abbreviation, M., is not needed here, for the reason that q. s. ad signifies that the last ingredient, glycerine, is to be added to what has already been prepared, in sufficient quantity to increase the bulk of the mixture to the amount required; and will constitute the order to mix, without further directions.

A little knowledge of the relationship between the nominative and genitive cases, through the various declensions, will enable one to do tolerably correct work in Latinizing his prescriptions, if it be remembered that ℞ is the sign of a transitive verb, and that the amounts of ingredients are its objects; as, *Take* of sulphate of quinia,

fifteen grains, and that the name of the ingredient is in the genitive (*of* sulphate of quinia).

The genitive case, then, is the only point in which a knowledge of Latin is really essential, in order that the writer may pass muster as a skillful prescription writer, and the five different declensions should be studied for a knowledge of the proper use of this case, which is indicated by the letters in the termination of the name in question.

For example: In the first declension the nominative singular ends in *a*, and the genitive is formed by supplanting the final letter with *æ*; as, nominative *cimcifuga*, genitive *cimcifugæ*. The word *cimcifuga*, then, mentioned in a prescription after the sign *R*, should be so written. *Quinia* should be written *quinia*, *morphia*, *morphia*, etc.

But when we apply this case ending to the large number of agents in the *materia medica* through the five declensions with their different classes, it becomes a subject of no little magnitude, and evident that it must be made a technical matter; *i*, *e*, each agent liable to be included in a prescription must be studied with reference to its ending in the genitive singular, and memorized. This can soon be accomplished by one who desires to appear classical; and, as there is no call for a Latin signature, when this is attained the physician is pretty well equipped to write Latin prescriptions.

To this however should be added a familiarity with the abbreviations commonly in use, a list of which can be found in every medical dictionary.

A clever maneuver adopted by many prescribers, who are not certain as to terminations, is that of abbreviating in such a way that there need be no mistaking the agents referred to by the writer, and yet so that no case endings appear—the final syllable, or perhaps more of the word, being supplied by a period.

Such a prescription as the following one would pass as a fair production, and the writer would not commit himself upon doubtful points, if he were not a Latin scholar:—

℞ Cimicif. rac. (s. m.) fʒi.
 Pulsatil. (s. m.) fʒss.
 Aq. q. s. ad fʒiv.

But the abbreviating of medical terms requires some care, in order that non-professional persons may not ridiculously and disastrously mistake the meaning. The account of the physician who was summarily dismissed for prescribing “Fl. ex. rham. cat.” (cascara) for a susceptible lady is probably fanciful, but it serves to illustrate the danger of recklessness in this particular—for the physician’s prescriptions are often scanned by curious patients.

After all, it is as well to adopt the plan of writing the names of the ingredients in plain English, after the regular superscription, entirely foregoing the effort to Latinize; at least this might avert many embarrassing situations. For example:—

℞ Sulphate of quinia, gr. 15.
 Powd. Glycyrrhiza, gr. 30.
 M., etc.

With many, the use of Arabic numerals has succeeded the more common custom of employing Roman characters to designate amounts of ingredients to be employed, and the numbers are not so apt to be mistaken when not plainly written.

The metric system of designating amounts of ingredients in prescriptions is worthy of passing notice as a novelty, only. Could any good result from this attempted innovation there might be some excuse for the proposed departure. Even were this considerable, it could hardly compensate for the confusion and accident, liable to at-

tend the transition. The popular and generally employed system serves every purpose, and will probably remain in use.

Plainness of execution is an important element of good prescription writing. The efficacy of the remedy or combination will depend upon the proper or relative amounts of ingredients employed; the safety of the patient demands that great care shall be exercised when material doses of aconite, arsenic, belladonna, colocynth, digitalis, phosphorus, strychnia, and other powerful drugs are prescribed.

INFUSIONS AND DECOCTIONS.

This subject should have been included under "Forms for Administration," but was overlooked.

Water extracts the virtues of some organic remedies better than any other menstruum, and when this is the case, preference should be given, either to an infusion or decoction, even though the form may not be quite so elegant as some others.

Infusions are made by immersing the crude product in hot or cold water, for a time; decoctions, by allowing the water to boil. In some cases the process of boiling injures the medicinal principles, while in others it is essential, to extract the virtue required.

Some of our indigenous remedies are nearly worthless for certain purposes, except when water is used to extract their virtues, though when such plan is resorted to they may occupy the highest place as restoratives. The phenomenal success achieved by the early Botanics was due, largely, to the fact that their remedies were administered in the form of "teas" prepared from recent indigenous plants.

Erigeron canadensis is an exceptionally valuable remedy for arresting the alarmingly exhaustive watery evacuations peculiar to some of the active stages of cholera

infantum, if a decoction of the fresh plant be drank freely, but is comparatively worthless in any other form, for this purpose. Professor Howe's prescription of logwood for diarrhea stipulates that an infusion of the aqueous extract must be employed. A decoction of recent root of *cimicifuga* excels all other forms of this agent in muscular rheumatism. I often turn from more elegant forms, back to this primitive one, resorted to for convenience and economy during an early country practice, to find a waning faith in an old-time remedy renewed. And so with a number of other common indigenous remedies.

Professor J. U. Lloyd, senior member of the firm supplying "specific medicines," entertains views very similar to these, and views which entitle him to the highest respect for his unselfish candor, when his own interests would be better served by indorsing, unreservedly, the products of the laboratory.

But valuable as these forms are, they should only be resorted to upon exceptional occasions (when more elegant forms will not suffice), as the dose must be bulky and often nauseating, while the practice (unless the manner of preparation be kept from the patient) is liable to inspire a lack of confidence on account of its apparent crudity.

THE MEDICINE CASE.

The arrangement of a medicine case adapted to emergencies and every-day needs, is a subject of grave importance to the recent graduate. What shall he carry with him in order to be prepared to minister to the wants of a variety of cases liable to be met with during his daily rounds?

This is a question not to be dealt with lightly. It would be an easy matter to provide pretty well for every case likely to be encountered in a large practice in both acute and chronic cases, were there no inconveniences to be avoided in the way of bulky, heavy medicine chest, filled with a large assortment of vials and packages, many of them seldom used, liable to be broken, and subject to more or less leakage to result in gummy coatings for the adhesion of powders, dust and other accumulations, to say nothing of the odors emanating to render the whole outfit a nuisance. It is one thing to be provided with necessary drugs, and another to have them so disposed as to present an agreeable and inviting appearance to the patient, and not be a cause of offense to the practitioner himself. The filling of a medicine case in the start is a small part of the affair. The outfit must be overhauled, cleaned, the vials refilled, wiped, newly corked, and re-labeled every few days, if complete justice is done the subject. Really the medicine case in some respects is a great nuisance, and it is no wonder that many city physicians are so ready to relegate the entire management of the drug question to the druggist, and content themselves with prescription pads and pencils.

But the rural practitioner must carry his own medicines; drug stores are not always at convenient hand in

thinly populated districts, and provision must be made for his urgent demands. It is advantageous in many respects for the city physician to have with him a few of the essential remedies while on his daily rounds; let him, however, dispense with those likely to be needed but seldom, as he can usually provide himself with these at leisure, or in advance, as when forewarned by the presence in his neighborhood of an epidemic or endemic outbreak calling for some special agent. The fewer the remedies that can be selected for daily transportation and the combination prove efficacious, the better.

It may be safely asserted that there is no call for the carrying, habitually, of remedies for the treatment of chronic cases; these can be supplied to order and thus lessen the bulk and aviordupois of the every-day outfit. In acute diseases the remedies in the case can be varied to suit the season of the year, or any particular epidemic which may prevail. And now let us see what shall be supplied in the beginning.

Febrile and inflammatory conditions are so common in acute diseases that the list of sedatives is suggested in the start—remedies influencing the circulatory system. These are Aconite, Belladonna, Gelseminum, Jaborandi, Rhus Tox., and Veratrum. But here are six remedies—a sufficient number of the first class considered to go quite a long way toward filling a respectable medicine case, and we must try to drop some of them—at least leave them on the shelves for occasional resort when absolutely indispensable or preferable to the more commonly useful ones; let us consider them in detail:—

Aconite.—Aconite is first on the list and a remedy applicable to a wide range of cases. It is a sedative in fever and inflammation, a calmative in restlessness, a pain reliever in rheumatic and neuralgic complaints, and it specifically influences irritation of the larynx, pharynx,

and intestinal tract, if the vascular areas concerned are acutely disturbed. It is what the homeopathists would term, "a polychrest". It is an indispensable agent, especially valuable as the children's remedy, while it could hardly be spared in the adult class, and it is a remedy to be employed in all seasons and in almost all acute affections. We will fill the first vial then with aconite, the first decimal dilution of the specific medicine being preferable to the full strength, as in dispensing it to very small children one drop too many of the stronger preparation in a glass of water might prove a grave mistake.

Belladonna.—Belladonna is the next remedy on the list, and one fulfilling important purposes when indicated, but one, after all, only needed in isolated cases, and at long intervals. In a large practice not more than one or two cases requiring belladonna are liable to be encountered in a year, and that amount of use hardly warrants the constant lugging of the remedy, especially as the cases are not those demanding great haste as to its administration. Belladonna cases border on the line of chronicity.

Gelsemium.—The next remedy to be considered possesses more claims to a place in the medicine case than the one just mentioned. Though not indispensable as a sedative, its action in determination of blood is very acceptable in many cases; yet this action is probably as well represented by *jaborandi*. Still *gelsemium* possesses some antimalarial properties and abets the action of quinia in many cases, and is probably as positive an agent as any we have to assist the relaxation of a rigid os uteri. After all has been said however *gelsemium* hardly offers any advantage in any respect over *jaborandi*, and we may leave it out feeling that its place will be well supplied by agents more important in other directions.

Jaborandi.—We next come to consider *jaborandi*, as important a remedy as aconite, and as indispensable to a

satisfactory practice. It is a more positive sedative than gelseminum or veratrum, and as sure an antispasmodic as gelseminum or lobelia. It is applicable in appropriate doses to almost any febrile or inflammatory condition, and full doses will relieve the agonizing pain of angina pectoris, inflammatory rheumatism, or muscular spasm, more promptly, effectively, and safely, than any other remedy. It enjoys the reputation in old-school quarters of being a specific in erysipelas, one doubtfully earned as yet, perhaps, but one worthy of remembrance for future trial, while in that dire disease known as cerebro-spinal meningitis it has no equal. In any febrile or painful condition where a dry skin is persistently present we need this remedy especially, but it is not contra-indicated if this symptom be not prominent. The only preparation of this drug that I can recommend from personal knowledge is the specific medicine. Twenty or thirty drops of this constitute a full dose, and two full doses within half an hour should be the limit of full doses, where there is severe pain. A dram to four ounces of water will constitute a fair sedative mixture for ordinary cases in teaspoonful doses. This may follow the administration of full doses for the relief of pain of inflammatory nature, or may be used for the ordinary purposes of a sedative. We will fill the second vial with specific medicine of jaborandi, feeling that with it and aconite we are pretty well equipped with sedatives, while we have a brace of remedies of quite a wide range of use outside the strict limits of vascular therapeutics.

Rhus Tox.—Does this agent fulfill any indications not covered in common by other members of the group? I think it does. Many febrile states are attended by persistent gastric irritability, which interferes with the action of other sedatives. Here the tongue is pointed with papillæ elevated, reddened at the tip, and tremu-

lous on protrusion, while there is an unpleasant nausea present. These cases usually offer the characteristic rhus tox. pulse. Whether they do or not rhus is the sedative to combine with aconite until all evidence of gastric irritation has passed away. Rhus is the corrective to use on that border-line where febrile cases merge into typhoid conditions. It is the remedy to arrest that tendency to blood depravation which later must be met by baptisia—indications, extreme restlessness with partial delirium. It nips many a case of continued fever in the bud when properly adapted, and is valuable when indicated, in cholera infantum and other acute diseases of children. Combined with aconite, it arrests cholera morbus at once; here small doses should be given every few minutes, until the vomiting and cramps cease. We will fill the third vial with specific medicine of rhus tox.; ten drops of this in four ounces of water, dose a teaspoonful every hour, or oftener.

Veratrum.—Then comes veratrum. Is this remedy worth the trouble of carrying to the bedside of every patient lest it be required at a moment's notice? I think not. The principal point of commendation for veratrum over other sedatives is its value in pneumonia, inflammation of the lung tissues; and here we have a more positive agent in asclepias. During a pneumonia season veratrum might be substituted for some other remedy in the case, for a time, but it will not be required often enough to warrant every-day carriage. Even in pneumonia, where it has been so highly lauded in some quarters, jaborandi and asclepias combined are far superior, in a majority of cases.

After the sedatives we ought to consider another class of remedies very nearly allied, namely, those which will correct blood depravation consequent upon febrile action, the antizymotics or antiseptics. These are baptisia, ech-

inacea, hydrochloric acid, rhus tox., sulphite of sodium, and sulphurous acid. What are the experiences of old practitioners with regard to the frequency of need of these agents? I believe I voice the sentiments of a majority of those who have had much experience when I assert, that with the exception of rhus, which has already been adopted, in this climate the only one frequently called for is the sulphite of sodium. The others are indispensable when indicated, but are so seldom needed that it would be better to have them ready in the office for resort when required than to burden oneself with them unnecessarily.

Sulphite of Sodium.—This remedy then will occupy the fourth place. It is indicated in any case where the tongue presents the pasty-white coating, and on the Pacific Coast this symptom is not an uncommon one. I usually administer it in small capsules, one or two grains, every four or six hours. Nothing can well be imagined more unpleasant to the taste than a solution of this agent in water. I was once dismissed from a case on the strength of a sodium sulphite solution. The patient became disgusted with both medicine and doctor. Let the remedy be concealed in capsules and carried in the vial for immediate use.

The heart and lungs may next be thought of and the remedies likely to be used frequently in that direction provided. Such an intimate relationship exists between the functions of the heart and the pulmonary circulation that the remedies needed here will be somewhat in common. Among these is *aspidosperma quebracho*, one not infrequently needed where want of cardiac power is attended by difficult, labored respiration. I find the symptom sufficiently often in my rounds to warrant the carrying of a vial of this remedy.

Quebracho.—This will constitute the fifth remedy, the

fluid extract of Parke Davis & Co., usually serving a good purpose.

Cereus Bonplandii.—This remedy will supply the sixth place. It is a more prompt and efficacious remedy to improve the power of the heart than digitalis, and in irregularities consequent upon reflex disturbances it supplies a better purpose.

The list of cardiac remedies is large and we cannot expect to cover a great deal of ground with two agents, but, with jaborandi for severe pains here, and those named, we have a respectable outfit for a large per cent of the cases met with in general practice. And as pulsatilla will be carried as a uterine and ovarian remedy, resort may be had here in nervous excitability of the heart and in imaginary cases or those where cerebral centers are more disturbed than cardiac function, as marked by "fear of impending danger".

The vascular area in the lungs supplied by the bronchial arteries, demands a special class of remedies. It is here that veratrum finds its best place and here that we derive great benefit from asclepias. Then the respiratory membrane supplied from this source demands a number of remedies. The special sedatives, aconite, rhus, and jaborandi come in here splendidly in acute inflammatory conditions, even to the result of acting well as cough remedies. But after the first stage is passed something more special is demanded. Then ipecac and tartar emetic, or lobelia, should be employed.

Asclepias.—This then will fill the seventh vial to serve as a reliance in hyperemic conditions of the lung-parenchyma and to combine or alternate with the sedatives in pneumonia. We will use the specific medicine in five to ten drop doses every two or three hours, as required.

Ipecac.—Ipecac supplies the place of a bronchial remedy, relieving subacute inflammation of the respir-

atory membrane and curing cough with expectoration, where the bronchial tubes remain irritated, after the active stage of irritation has passed off. As a remedy to relieve intestinal irritation both in children and adults, it is one of the most effective, being almost indispensable in cholera infantum and dysentery. The specific medicine serves the best purpose; from five to twenty drops in four ounces of water, teaspoonful doses being administered every one or two hours according to age and circumstances. We will fill the eighth place with specific medicine ipecac.

Tartar Emetic.—This remedy is valuable in coughs attended by subcrepitant sounds—subacute inflammation of the smaller bronchi. It is the specific remedy for the influencing of the respiratory membrane in this portion of the tract. The condition is familiarly known as “capillary bronchitis”, and tartar emetic cures here as promptly as any specific could. As a remedy in asthma, it serves a good purpose for temporary relief at least. I employ the second decimal trituration, as less liability of overdoing the dose is thus present than when the crude article is carried, administering two or three grains every two hours to adults, but for infants and small children, using three grains in half a glass of water, ordering a teaspoonful at a dose. The ninth vial will be filled with this agent.

A number of other remedies might be selected for their influence upon the respiratory mucous membrane, but we are now trying to avoid cumbering the overworked practitioner, and will let these suffice, for the present.

The alimentary canal next demands attention. Beginning with the pharynx we have the one remedy for acute inflammation of this part and the fauces,—a very common complaint—in phytolacca. For the stomach we have aconite, ipecac and rhus—remedies already adopted, for

irritation and **nausea**, *cimicifuga* and *colocynth* for painful conditions of the organ involving the nervous and muscular structures, *aconite* and *ippecac* for irritation of the small intestine, *colocynth* for abdominal neurosis, *polymnia* for fullness of the gastric capillaries, *chionanthus* for torpor of the biliary cells, and *chelidonium* for subacute inflammatory states of the hepatic structures. Then we have *collinsonia* for congestive conditions of the vascular supply to the pelvis, especially the hemorrhoidal plexus.

Phytolacca.—*Phytolacca* will be the tenth remedy chosen, an indispensable agent for the cure of a large number of cases of sore throat. Combined with *aconite* we will prescribe it almost every day in the year, and derive prompt and satisfactory results. The specific medicine is better than any other preparation except one made by covering the green root with alcohol. The best preparation I have ever used was thus evolved. A dram of this in four ounces of water with five or six drops of *aconite* (for the adult) is the prescription for a non-malignant, acutely inflamed throat. Additional recommendations are its almost positive success in puerperal mastitis and its action in bronchocele and lymphangitis. Though slow, it is one of our most reliable remedies in goitre.

Polymnia.—The vascular area described by the distribution of the coeliac axis is particularly the specific field of action for this agent. Subacute inflammatory conditions and hyperemic states generally, of parts supplied from this source, especially by the gastric branches, demand it. Many unpleasant cases of dyspepsia of painful character are relieved by the use of small doses of *polymnia* through this influence. The well known action of *polymnia* on the spleen would also confirm its selection, though here we would not need it sufficiently often

to justify its admission to a limited list of remedies for every-day use. We will choose this agent for number eleven. *Carduus marianus*, *ceanothus Americanus*, and *grindelia squarrosa*, belong to the same group, and one of them might be chosen instead of *polymnia*. As a gastric remedy, however, I consider the one last named the first to choose. The specific medicine is the form I commonly use.

Chionanthus.—Professor Goss' well known hepatic agent cannot be dispensed with. People, especially patients, still possess livers, and something mild but certain, to improve the biliary functions is a desideratum. This demand is supplied by *chionanthus* better than by any other single remedy we possess, and it is not the one to betray our confidence when this confidence is rationally placed. The twelfth remedy will be a vial of the specific medicine *chionanthus*.

Chelidonium.—This agent is specially indicated in hepatic colic where the pain is inflammatory in character and involves the capillaries of the hepatic artery. It will abort hepatic abscess if begun in time and the patient has not been too heroically dosed with mercury. Catarrhal inflammation of the biliary ducts also yields to this agent. Let this be number thirteen.

Colocynth.—A medicine case would not be fitted without a vial of *colocynth*. It is as important a remedy as aconite or *jaborandi*. It so completely covers the ground of neuralgic pain in the abdomen,—abdominal neurosis—that it applies to the smallest infant or the oldest adult, and every age between. We will prescribe it almost daily, and will find it one of the most specific of specifics. Neuralgic, intermittent abdominal pain of any character, whatever organ is involved,—stomach, spleen, liver, or intestines, is amenable to its influence. It not only relieves the pains of dysentery but alone often cures.

Infantile colic is readily relieved by minute doses of it. Evidently we cannot get along without this remedy and will fill the fourteenth place with it, the 2x or 3x dilution being strong enough, considering its extreme bitterness. The dose of this may vary from two or three drops for infants in four ounces of water, dose a teaspoonful, to a teaspoonful in the same amount of water when prescribing for adults.

Collinsonia.—This remedy completes the list of drugs devoted to the alimentary canal. We might make it larger but have encompassed considerable with a small number, and that is the object when filling a medicine case. *Collinsonia* will be held in reserve for its influence upon the lower bowel, hemorrhoidal conditions being its principal field of usefulness. Hypogastric pain if emanating from disturbances of the alimentary canal also disappears before its influence, and it has proven effective in dysentery, especially for the pains, when located lower down. Hemorrhoidal states are favorably influenced by other remedies but where only one is carried this will be the first choice.

One point to be emphasized here is that the preparation must be from the plant, and not the root. The root is employed in the preparation of the specific medicine. Careful trial and observation have convinced me that a tincture of the green plant (leaves, blossoms, and stems,) is much superior as an agent to influence the pelvic viscera. The homeopathic mother tincture is thus prepared. While practicing in Ohio I made my own tincture from the plant freshly gathered, and always obtained the best of results. We will fill the fifteenth vial with green plant tincture of *collinsonia*. Of this from one to ten drops may be prescribed at a dose for an adult.

And now we must add a few remedies for the reproductive apparatus—applicable to both sexes. We will only choose three as we will be able to get along with

these very well in acute practice—macrotys, pulsatilla, and sabal serrulata.

Pulsatilla.—This remedy will come in play for the relief of unpleasant sensations in the female pelvis during pregnancy, for uterine colic, for dysmenorrhea and neuralgia. “Nervousness” due to sexual disturbances also calls for pulsatilla. It is the woman’s remedy in a thousand different unpleasant states, while it has been highly lauded as a remedy for coughs and gastric disturbances. Orchitis and orchialgia also call for it, and we find therefore a place for it in the treatment of disturbances of the reproductive apparatus in both sexes. The German tincture, made from the green plant, is sold as specific medicine, and also kept at homeopathic pharmacies under the name, “Mother Tincture”. We will fill the seventeenth vial with pulsatilla.

Cimicifuga.—This remedy is a valuable one and can hardly be dispensed with. It is one of the group of remedies in rheumatic conditions applying especially to the sexual apparatus of both sexes. Orchialgia, of rheumatic tendency, ovarialgia, and uterine pain, are benefited by it. It combines well with pulsatilla in dysmenorrhea. In pelvic pain and weight attending gestation it may be employed alone or with pulsatilla, to advantage. The specific medicine is to be preferred here, though care must be exercised about using it in too large doses, as the drug is powerful in this form. Half a dram in four ounces of water, dose a teaspoonful, is about right. The eighteenth remedy will be cimicifuga (macrotys).

Sabal Serrulata.—Saw palmetto fills a very important place; it will often be serviceable where prostatic pain is present. It is the only remedy known which specifically relieves painful conditions of the prostatic urethra. The analogue of this part, in females, the uterus, also responds to its action, and the remedy thus becomes one of frequent

demand. Add one or two drams of the fluid extract to four ounces of water and order a teaspoonful every two or three hours. I usually employ a fluid extract manufactured by Parke, Davis & Co.

Rhus Aromatica.—We want at least one remedy to influence the urinary apparatus, and this fills the place of half-a-dozen ordinary agents. Irritation of the kidneys, and vesical disturbances of acute or subacute character are especially relieved by it when properly adapted. Vesical tenesmus is an unpleasant symptom often encountered, and usually relieved when this remedy is used. The specific medicine is most reliable—a dram added to four ounces of water; dose a teaspoonful every two or three hours.

Phenacetin.—This remedy is one which I would not like to be without, if I were to practice far from a convenient drug supply. It is the remedy above all others for muscular rheumatism and rheumatoid pains generally. It is more positive, and fully as safe as *cimicifuga* or *rhus tox.*, and it acts more promptly in these cases. As a remedy for rheumatic seasons,—Winter and Spring, it has become almost indispensable to me. Three or four grains may be given every three or four hours either in acute or chronic cases with full confidence of satisfactory results.

Antifebrin.—This remedy cures headache—migraine—in short order. It is applicable to many cases of severe spasmodic pain. It is preferable to antipyrin, because this is apt to produce debility when frequently repeated. Two or three five grain doses half an hour apart will suffice. It is a remedy for acute troubles and should be carried, at least by the country practitioner.

Quinia Sulphas.—Periodicity will be found in almost every location, and cropping out in many a case, to perpetuate and aggravate it if not interrupted. Quinia is

the typical antiperiodic. It does not compare with alstonia as a curer of malarial cachexia, but to interrupt periodicity it has no equal, and the medicine case would not be complete without it. It might be carried in three-grain capsules, thus being covered from the palate so that the objectionable taste would be avoided.

Morphia Sulphas.—The customary vial of morphia cannot safely be dispensed with yet. If we cannot cure the pain in our patient we must paralyze him, for a time, and morphia is the agent to do it with, since it is more prompt and reliable while less bulky than other narcotics. Pellets of one-fourth grain of the sulphate will serve the purpose of combining dose with pleasant form for administration.

We now have twenty-four remedies selected, and if we were perfectly certain that all the agents urgently required had been chosen, a twenty-four-vial case might answer the purpose. But this number does not make up well into a case of vials, each containing enough to supply the average country practitioner with a satisfactory amount to avoid frequent refilling. A vial once emptied is liable to be neglected until the agent is needed again, and the vial oftenest emptied is most likely to contain the most important remedy. However, twenty-four two, or three-dram, slim vials, arranged in two rows, may constitute a shapely and convenient pocket-case for one who needs to resort to it but seldom, but half-ounce vials are really small enough for a country outfit. Twelve of these would lengthen the case beyond proper proportions, and eight would leave the rows rather short, so we will select a thirty-vial case, each of the vials to contain half an ounce or more, the whole arranged in three rows. Thus we have six vials not yet filled, but subject to demand, for agents which may prove as important as any of those already mentioned, and likely to soon come into service.

This case should not take the place of an obstetric outfit, which should be at hand, ready, whenever needed, in separate bag, with vial of pusatilla, ergot, chloroform, etc. An emergency case might also be kept in readiness, containing antidotes for poisons, bandages, etc., for accidents, but the physician would not be benefited by lugging such an outfit with him day after day.

Résumé.— And now it should not be supposed that an effort has been made to designate all the properties of agents which have been suggested. Many important uses for the different remedies have been passed in silence, as this article has not been intended as a treatise on materia medica, and the agents have been named only in connection with the properties which have the most readily suggested them. Many valuable uses may be made of various ones in chronic as well as in acute diseases, and valuable properties in acute conditions have been neglected, as, for instance:—

Aconite is an almost infallible remedy in non-membraneous forms of croup—all the remedy we need; jaborandi breaks up a cold very readily in full dose by inducing profuse perspiration, and is the best of remedies where suppression of urine threatens uremia; rhus tox. is our best agent in erysipelas, especially if the tissues of the face are the parts principally involved, and is a superior remedy in ophthalmic practice where the appendages of the eye are invaded by inflammatory conditions. Sharp pain in the frontal region, especially in the left orbit, calls for it, according to Scudder, though this I have never been able to prove.

And so I might go over the list and find new uses for nearly every agent mentioned, but instead will respectfully refer the student to my forthcoming work on Specific Therapeutics.

INDEX.

Aconite in Croup.....	162
Aconite in the Medicine Case, its Place.....	149
Aconite, Pulse Indications.....	62
Alimentary Canal.....	67
Antiperiodic, Quinia.....	160
Arterial Tension.....	58
Art and Science of Prescribing.....	119
Asclepias in Pneumonia.....	154
Asthma, Tartar Emetic.....	155
Auditory Center, Therapeutic Affinities.....	87
Aural Pain.....	116
Baptisia, Tongue Indications.....	76
Belladonna, Pulse Indications.....	62
Biliary Ducts, Inflammation of, Chelidonium.....	157
Blood Making.....	39
Blood Pabulum, How Supplied.....	40
Blood Pressure.....	58
Bronchocele, Phytolacca.....	156
Bronchial Remedies.....	155
Bryonia in Painful Mammæ.....	101
Capsules as Vehicles.....	132
Cardiac Pain, Remedies for.....	116
Carduus Marianus in Fullness of the Abdominal Vessels.....	55
Care of the Medicine Case.....	148
Castor Oil, Affinity for the Mammary Gland.....	101
Cereus Bonplandii in Feeble Heart Action.....	154
Ceanothus Americanus.....	55
Cerebral Pain.....	116
Cimicifuga in Rheumatism.....	159
Classification of Remedies on the Ground of Dose.....	18
Climatic Influence in Insanity.....	60
Climate as a Modifier of Arterial Tension.....	60
Chelidonium in Hepatic Affections.....	157
Cholera Morbus, Rhus Tox. iii.....	152
Common Examples of Drug Affinity.....	8

Coughing, Center for.....	89
Crises in Disease.....	101
Cerebro-Spinal Meningitis, Jaborandi in.....	101
Clinical Experience Essential to Proper Adaptation of Remedies to Different Phases of Disease.....	10
Defecation, Center of.....	93
Delirium With Restlessness, Rhus Tox.....	152
Deglutition, Center for.....	89
Depressor Nerve.....	90
Dilatation of Pupil, Center for.....	89
Dilutions.....	131
Dose, Question of.....	132
Dry Tongue.....	74
Dry Skin, an Indication for Jaborandi.....	151
Electricity, its Place as a Remedial Agent.....	14
Enteric Pain.....	116
Erection of Penis, Center for.....	94
Erysipelas, Jaborandi in.....	151
Essential Elements to Proper Application of Dynamical Therapeutics.....	14
Excited Circulation, Treatment.....	47
Feeble Circulation.....	48
Forms for Administration of Drugs.....	128
Gangrene, Arrest of Blood Supply a Cause of.....	102
Gastric Irritability, Rhus Tox.....	152
Gastric Pain, Remedies for.....	157
Gelseminum, Specific Indications for.....	62, 150
Germicides.....	25
Glycerine as a Preservative of Medicines.....	125
Glycogenic Function of the Liver.....	55
Hahneman's Method of Preparing Triturations.....	127
Headache, Antifebrin.....	160
Heart Diseases, Pulsatilla in.....	154
Hemorrhoidal Conditions, Collinsonia in.....	158
Hepatic Pain, Remedies for.....	117
Hepatic Colic, Chelidonium.....	157

Hydrastis in Myalgia.....	117
Hydrochloric Acid, Tongue Indications for.....	76
Hypogastric Pain.....	158
Inflammatory Rheumatism, Jaborandi in.....	151
Infusions and Decoctions.....	146
Ipecac in the Medicine Case, Cholera Infantum, Bronchitis, etc.	154
Jaborandi, Indications for.....	62, 150
Jaborandi in Meningitis.....	81
Jaborandi in Muscular Pain.....	117
Jaborandi, its Place in the Medicine Case.....	150
Line of Demarkation between Functional and Structural Disease, Difficult to Always Determine.....	24
Liver, Influence of upon Proteids.....	56
Liver, Invigorated by Minute Doses of Mercurius Dulcis.....	57
Liver, Therapeutics of.....	54, 157
Mammary Gland, Therapeutics of.....	100
Medicine Case.....	148
Micturition, Center for.....	94
Minuteness of Dose an Essential Element of Success.....	20
Modifying Influences in Drug Affinity.....	15
Morphological Elements of Disease Considered.....	14
Motor Areas.....	86
Mucous Membranes, Affinities for.....	100
Muscular Pain.....	117
Myalgia.....	116
Neuralgia of the Abdominal Viscera.....	157
Neuralgic Pains.....	117
New Formations.....	112
Nitrate of Uranium in Diabetes.....	56
Nitroglycerine, Pulse Indications for.....	63
Nutrition Centers of.....	94
Occipital Pain.....	117
Odontalgia.....	117
Olfactory Center.....	86
Optic Centers.....	87
Orchialgia.....	117

Orchitis.....	159
Origin of Blood Corpuscles.....	41
Pain, Definition of, Remedies for.....	115, 116, 117, 118
Pancreas, Therapeutics of.....	100
Parenchyma of the Lungs, Agents for.....	154
Parturition, Center for.....	94
Pathological Processes not Subject to the Same Laws of Con- stancy as those of Normal Life.....	35
Pelvic Pain During Pregnancy, Pulsatilla for.....	159
Penthorum in Chronic Pharyngitis.....	111
Pericranial Pain.....	118
Periosteal Pain.....	118
Pharmaceutical Incompatibility.....	138
Pharyngitis, Phytolacca in.....	156
Phenacetin in Rheumatism.....	160
Physiology teaches the Selective Properties of Cells.....	8
Phytolacca in the Medicine Case.....	156
Plasma Remedies.....	21
Plastic Remedies.....	22
Pneumonia, Asclepias in.....	154
Polymnia in Fullness of the Abdominal Capillaries.....	55
Potassium Phos., Tongue Indications for.....	76
Portal Circulation, 53, Therapeutics of.....	54
Potomaines.....	21
Prescribing, Science and Art of.....	19
Prescription Writing.....	140
Pulmonary Circulation.....	48
Pulsatilla in Cardiac Affections.....	154
Pulsatilla in Nervousness of Women.....	159
Pulse Indications.....	62
Quality of Drugs.....	119
Quebracho in Deficient Cardiac and Respiratory Action.....	153
Question of Dose.....	132
Reciprocity of Action Between Remedy and Function.....	35
Reflexes.....	16
Relation of Cardiac and Pulmonary Remedies.....	51
Relation of Pathology to Dynamical Therapeutics.....	31
Relation of Physiology to Dynamical Therapeutics.....	35
Relation of Rectal Diseases to Disordered States of the Ali- mentary Canal.....	69

Remedies Which Influence the Blood-Making Processes.....	43
Remedies Which Influence the General Circulation.....	47
Respiratory Center.....	89
Rheumatism, Cimicifuga, Phenacetin.....	159 160
Rhus Tox., Tongue Indications for.....	76
Saliva, Center for Secretion of.....	89
Salivary Glands, Therapeutics of.....	100
Saw Palmetto, Influence upon the Mammary Gland.....	101
Secretion and Excretion.....	96
Selective Properties Common to the Tissues of all Living Bodies.....	7
Seminal Emission, Center for.....	94
Silica in Enchondromata.....	112
Sneezing, Center for.....	89
Sodium, Sulphite of, its use in Every-day Practice.....	153
Special Sedatives.....	47
Special Vascular Areas, Therapeutics of.....	104
Special Sedatives Promoters of Secretion.....	98
Substitute for Sugar of Milk as a Vehicle in Triturations.....	130
Sulphite of Sodium, Tongue Indications for.....	75
Sulphurous Acid, Tongue Indications for.....	76
Sympathetic Nervous System.....	95
Syzygium in Diabetes.....	56
The Alimentary Canal.....	67
The Blood.....	38
The Bronchial Vascular Area Demands a Special Class of Remedies.....	154
The Cerebellum.....	88
The Cerebrum.....	83
The Dual Action of Drugs.....	18
The General Circulation.....	44
The Medulla Oblongata.....	88
The Nervous System.....	79
The New Formations.....	112
The Old Classification.....	27
The Principles of Selection.....	26
The Quality of Drugs.....	119
The Question of Dose.....	132
The Single Remedy Versus Combinations.....	135
The Spinal Cord.....	93
The Temperature.....	64
Therapeutic Classification.....	17
Therapeutic Incompatibility.....	137

Thuja a Remedy for Warts.....	113
Times for Gathering Medicinal Plants.....	122
Time for Administration of Remedies.....	139
Tissue Regeneration.....	101
Tongue Indications.....	75
Triturations.....	125
Typhoid Tendency, Rhus Tox. in.....	152
Uterine and Ovarian Remedy.....	57
Variety of Action of Remedies Upon a Given Part.....	23
Vaso-Motor Center.....	90
Veratrum, Pulse Indications for.....	62
Veratrum, its Place in the Medicine Case.....	152
Vesical Irritation, Rhus Aromatica.....	160
Vomiting, Center for.....	89
Warts, Thuja and Magnesium Sulphate in.....	113





DESCRIPTIVE CATALOGUE

—AND—

PRICE-LIST

—OF—

Eclectic • Text-Books.

FOR SALE BY

John M. Scudder & Sons.

MEDICAL PUBLISHERS,

228 West Court Street,

Cincinnati, Ohio.

JULY 1, 1894.

Any Book in this List sent, post-paid, on receipt of Price.



As a school of medicine we profess to have a distinctive practice, unlike either our old school or homœopathic neighbors. We claim to use different remedies, or in different form and dose, and for different effects. We boldly claim a more successful practice than either of our competitors, and this claim can only be based upon different principles, a different therapeutics, and a different materia medica.

We must, therefore, have distinctive books which clearly state *our* methods of practice. Old-school works will not serve this purpose, neither will homœopathic. With the pretensions we make, if we can not show that we have such works, and depend upon them, we are frauds of the first magnitude.

In the early days of Eclecticism, the need of text-books was clearly seen, and great sacrifices were made to furnish them. The writers toiled without pay, and to publish the earlier works they practiced the most rigid economy for years to command the money. By these means we had Beach's works, Jones and Morrow's Practice, King's Dispensatory, and some others. The making of books was not an easy nor a profitable job.

Now we have a full list of text-books, or books of reference, and by frequent revision they are kept fully up to our practice of to-day. They have been very successful, more so than any American books in the market, and this is the best evidence of their value. They are bought by all schools of medicine, and when bought they are brought into active use.

BEACH, WOOSTER, M. D.

The Founder of Eclecticism.

The American Practice.

1 vol. 8vo; 873 pages; sheep. Price \$4.50.

ELLINGWOOD, FINLEY, M. D.

Professor of Chemistry in Bennett College of Eclectic Medicine.

Annual of Eclectic Medicine and Surgery.

1890, Vol. I. 8vo; 337 pages; cloth. Price \$2.00.

1891, Vol. II. 8vo; 425 pages; cloth. Price \$2.35.

GOSS, I. J. M., M. D.

Professor of Practice of Medicine in the Georgia College of Eclectic Medicine and Surgery.

Materia Medica, Pharmacology, and Special Therapeutics.

8vo, 586 pages; cloth, price \$3.50; sheep, \$4.50.

The Practice of Medicine; or, The Specific Art of Healing.

8vo, 569 pages; cloth, price \$3.50; sheep, \$4.50.

HOWE, A. JACKSON, M. D.

Late Professor of Surgery in the Eclectic Medical Institute, Cincinnati.

"Prof. Howe was recognized as one of the ablest teachers in this country, and an operating surgeon with but few peers in the West."

The Art and Science of Surgery.

Revised edition. 8vo, 886 pages; sheep. Price \$7.00.

Diagnosis and Treatment of Dislocations and Fractures.

Fourth edition. 8vo, 426 pages; sheep. Price \$4.00.

Operative Gynæcology.

8vo, 360 pages; sheep. Price \$4.00.

JEANCON, J. A., M. D.

Professor of Pathology in the Eclectic Medical Institute, Cincinnati.

Pathological Anatomy and Physical Diagnosis.Royal folio, 100 full page Colored Illustrations, 100 pages of text;
half morocco. Price \$20.00.***Diseases of the Sexual Organs. (MALE AND FEMALE.)***Royal folio, 80 full-page Colored Illustrations, 160 pages of text;
half morocco. Price \$20.00.**KING, JOHN, M. D.**

Late Professor of Obstetrics in the Eclectic Medical Institute, Cincinnati.

"Prof. John King, who was a teacher for more than half a century, is too well known to require more than a catalogue of his books." They are as follows:

***The American Dispensatory.* With Supplement by J. U. LLOYD.**

Seventeenth edition. 8vo, 1,641 pages; sheep. Price \$10.00.

Diagnosis and Treatment of Chronic Diseases.

8vo, 1,700 pages; sheep. Price \$10.00.

(KING, JOHN, CONTINUED.)

The New American Family Physician.

8vo, 1,042 pages; morocco. Price \$6.50.

The American Eclectic Obstetrics.

Revised, re-written and enlarged, by R. C. WINTERMUTE, M. D.

Ninth edition. 8vo, 757 pages; sheep. Price \$6.50.

Woman, Her Diseases and Their Treatment.

Fourth Edition. 8vo, 366 pages; sheep. Price \$3.50.

Urological Dictionary.

8vo, 266 pages; sheep. Price \$2.00.

LLOYD, J. U.

Professor of Chemistry and Pharmacy in the Eclectic Medical Institute, Cincinnati; Vice President of the American Chemical Society; Associate Author of the Supplement to the American Dispensatory; Author of the Pharmacy and Chemistry of the Student's Pocket Medical Lexicon.

The Chemistry of Medicines.

A text and reference book for the use of students, physicians and pharmacists; embodying the principles of chemical philosophy, and their application to those chemicals that are used in medicine and in pharmacy, including all those that are official in the Pharmacopœia of the United States.

One volume, large 12mo, 451 pages. Cloth, \$2.75; leather, \$3.25.

MERRELL, ALBERT, M. D.

Formerly Professor of Chemistry and Pharmacy in American Medical College, St. Louis.

Digest of Materia Medica and Pharmacy.

8vo, 512 pages; cloth. Price \$4.00.

McMILLEN, BISHOP, M. D.

Of Columbus, Ohio.

Mental and Reflex Diseases.

12mo, about 300 pages; cloth. Price \$2.00 net.

(In preparation.)

NIEDERKORN, JOSEPH S., M. D.

A Ready Guide to Specific Medication.

16mo, limp cloth. Price \$1.00.

SCUDDER, JOHN M., M. D.

Late Professor of the Practice of Medicine in the Eclectic Medical Institute, Cincinnati.

The Eclectic Practice of Medicine.

Fourteenth edition, revised. 8vo, 816 pages; sheep. Price \$7.00, post-paid. \$6.00, post-paid, to Journal subscribers.

The best recommendation of this work comes in the statement, **Fourteenth Edition.** It is the authority of our school of medicine, and thousands of sick are daily treated according to it. Thus far it has proven sufficient, and has given a success that others have failed to obtain.

(SCUDDER, J. M., CONTINUED.)

The Principles of Medicine.

Fifth edition. 8vo, 350 pages; sheep. Price, post-paid, \$4.00.

This is a study of the elements of disease and the principles of cure. It is the basis of our practice, and, as we think, the practice of the future. It gives a rational basis for medical practice.

The Eclectic Practice in Diseases of Children.

Sixth edition. 8vo, 486 pages; sheep. Price, post-paid, \$5.00.

If there is one thing more than another that we take pride in, it is our success in the treatment of children. The teaching of pleasant remedies, in small doses, for direct effect has relieved thousands of children from the horrors of "regular" medicine.

A Practical Treatise on the Diseases of Women.

ILLUSTRATED BY COLORED PLATES AND NUMEROUS WOOD ENGRAVINGS.

WITH A PAPER ON DISEASES OF THE BREASTS.

Fifteenth edition, revised. 8vo, 534 pages; sheep. Price, post-paid, \$4.00.

This work has stood the test of twenty years, and, as revised, gives our treatment of to-day.

Specific Medication and Specific Medicines.

Fourteenth edition, fourth revision. 12mo, 432 pages; cloth, \$2.50.

Specific Diagnosis.

Ninth edition. 12mo, 388 pages; cloth, \$2.50.

These companion volumes have had a larger sale than any other medical works in this country. They appeal to the feeling every thinking physician cherishes, that there must be something certain in medicine, if it can be discovered. They have had a very marked influence upon medical practice, not only of our own school, but also on regular medicine and homœopathy.

The American Eclectic Materia Medica and Therapeutics.

Tenth edition. 8vo, 748 pages; sheep. Price, post-paid, \$6.00.

The Eclectic Practice of Medicine for Families.

Twenty-first edition. Cloth, \$3.00; sheep, \$4.00; half morocco, \$5.00.

This work contains all of medicine that a family should know. It is anatomy, Physiology, Hygiene, Practice, Materia Medica, Surgery, and Obstetrics. It is concise, plain and correct, and will not lead to household drugging. Liberal offers to agents. Write for terms.

On the Reproductive Organs and the Venereal.

With Colored Illustrations of Syphilis.

Second edition. 8vo, 393 pages; sheep. Price, post-paid, \$5.00.

Medicated Inhalations.

Fourth edition, revised, with new Appendix, by WM. BYRD SCUDDER, M.D.

8vo, about 125 pages; cloth. \$1.00 net.

(In preparation.)

STEVENS, J. V., M. D.

Professor of Diseases of Children in the Bennett College of Eclectic Medicine and Surgery.

Annual of Eclectic Medicine and Surgery.

1892, Vol. III. 8vo, 444 pages; cloth. Price \$3.00.

1893, Vol. IV. 8vo, 503 pages; cloth. Price \$3.00.

1894, Vol. V. In preparation; cloth. Price \$3.20.

Successive volumes issued in each November.

WEBSTER, HERBERT T., M. D.

Professor of the Principles of Medicine and Pathology in the California Eclectic Medical College, San Francisco.

The Principles of Medicine.

8vo, 168 pages. Cloth, \$1.50.

Dynamical Therapeutics.

A work devoted to the Theory and Practice of Specific Medication, with special reference to the newer remedies.

8vo, 853 pages. Cloth, \$5.00; sheep, \$6.00.

WINTERMUTE, ROBERT C., M. D.

Professor of Obstetrics and Diseases of Women and Children in the Eclectic Medical Institute, Cincinnati.

American Eclectic Obstetrics.

A new edition of the standard edition of King's. Thoroughly revised and re-written.

8vo, 757 pages; sheep. Price \$6.50.*

WATKINS, LYMAN, M. D.

Professor of Physiology in the Eclectic Medical Institute; Physician to the Eclectic Hospital of Cincinnati, etc.

A Compendium of Specific Medication.

12mo, cloth; 400 pages. Price \$2.50 net.

(In preparation)

ECLECTIC MEDICAL JOURNAL.

JOHN K. SCUDDER, M. D.

MANAGING EDITOR.

48 to 64 pages Monthly. \$2.00 per Annum in advance.

FIFTY-FOURTH YEAR.

The acknowledged organ of liberal medicine, and a strong advocate of the doctrines of Specific Medication.

A Ready Guide to the Study of Specific Medication.

BY JOSEPH S. NIEDERKORN, M. D.

16mo, 116 pages; limp cloth. Price \$1.00.

NOTICES OF THE PRESS.

We are glad to see so excellent a little work in this special line. The book does not treat specific diseases, but considers organs or functions, and considers the specific action of our remedies upon them. The book is a little gem, and is worth many times its cost in putting our knowledge of the action of remedies into a tangible and accessible form. We trust every reader of the *Times* will purchase a copy of the book at once. —*Chicago Medical Times*.

This work has a familiar appearance, and I might have said, if I had seen the material elsewhere, that I had done it myself. I have seen nothing in the book that I could not endorse, and it is very creditably put together. It takes somewhat the form of "Organ Remedies," published in the *Journal*, grouping remedies as they influence some particular part or organs. This grouping of remedies is an aid to the physician in studying his case and finding the remedy.

I am not so sure that the author has not appropriated some of my thunder for the future, but I am very glad to see others coming into line and carrying part of the burden. I am sure every purchaser will get his money's worth, if he carries this volume in his pocket for reference for a three months.—*Eclectic Medical Journal*.

KING'S ECLECTIC OBSTETRICS,

REVISED, REWRITTEN, AND ENLARGED, BY

ROBERT C. WINTERMUTE, M. D.

Professor of Obstetrics and Diseases of Women and Children in Eclectic Medical Institute

Ninth edition. 8vo, 757 pages; sheep. Price \$6.50.

WHAT OTHERS SAY OF THE WORK.

For the past thirty-five years, King's *Eclectic Obstetrics* has been the standard text-book on obstetrics for practitioners and students of the Eclectic school of medicine. The fact that for the last fifteen years there has been no new edition of this work is sufficient to demonstrate the great need of this revision, which has been undertaken by Dr. Wintermute. The additions and revisions which have had to be made in every chapter of the work have necessarily been great, and Dr. Wintermute is to be congratulated upon the thoroughness with which he has done the work.—*Cincinnati Lancet-Clinic*.

It will be extremely gratifying to all students of Eclectic medicine to know that this most excellent work has been fully revised and brought up to date. The labors of Dr. Wintermute are apparent in the absolute modern therapeutics. But little improvement was possible on the obstetrical methods of Dr. King. When the book was written it was twenty years ahead of its time, or more. Those of us who have won laurels for ourselves by following its methods do not need the recommendation of others to convince us of its value. But therapeutics has advanced greatly in a few years, and in this particular the book needed the thorough revision Dr. Wintermute has given it. It is now the most advanced and practical work of its size published, and we bespeak for it an immense sale.—*Chicago Medical Times*.

SENT, POST-PAID, ON RECEIPT OF PRICE, BY

JOHN M. SCUDDER'S SONS, Cincinnati, O.

DYNAMICAL THERAPEUTICS.

A WORK DEVOTED TO THE

Theory and Practice of Specific Medication,

WITH SPECIAL REFERENCE TO THE NEWER REMEDIES;

With a Clinical Index, adapting it to the needs of the busy practitioner.

BY HERBERT T. WEBSTER, M. D.

Professor of the Principles of Medicine and Pathology in the California Medical College (Eclectic), San Francisco.

8vo, 680 pages. Cloth, \$5.00; sheep, \$6.00.

WHAT OTHERS SAY OF THE BOOK.

In perusing this book, the reader is first impressed with its exhaustive thoroughness, and next with the author's scholarship and modesty. Prof. Webster has certainly been a tireless student and investigator, for every line of his work discovers the most profound knowledge of the topics treated, and these cover all the essentials of practical therapeutics. High as our opinion of Dr. Webster's ability has always been, his book gave us a most grateful surprise. There is nothing in Eclectic literature superior to it, and only a little which can be said to be equal to it. It is restful, satisfying reading, because of its reliable solidity, and its innocence of egotism and ostentation. * * * A commendable feature is the insertion of papers on special subjects by our brightest men. Thus, he utilizes "Notes on Pharmacy," by that highest authority, Prof. J. U. Lloyd, and there are numerous other quotations from men who are bright lights in their specialties. Altogether, Prof. Webster has made an addition to the Eclectic book world which is of inestimable value, and which will place him in the van of the world's benefactors.—*Eclectic Medical Gleaner*.

We are glad to bring this work to the notice of our readers. It is a new and very practical study of Specific Medication by one who handles remedies with skill, and has shown more than usual capacity to teach.

The first study is the "Principles of Selection," and embraces 100 pages. It endeavors to show the reader that there are sound principles or reasons for the selection of remedies, and that when thus selected with care the specific effects may confidently be expected. The successful physician trains himself to correct observation. He sees the varying expressions of disease, recognizes their relation to the known action of remedies, and makes a rational adaptation of the one to the other.

Part II. commences the study of remedies under the head of "Specific Therapeutics." The first consideration is the tissue remedies of Schuessler, from which the author seems to have obtained better results than I have. As we "prove all things, and hold fast that which is good," the reader may wish to try the remedies, and here is a guide without buying Schuessler.

The remedies are further taken up under the headings of Blood Makers; Antiseptics; Antizymotics; Correctives; the Periosteum; the Articulations; the Nervous System; the Circulatory System; the Lymphatic System; the Ductless Glands; the Digestive Organs; the Respiratory Organs; the Urinary Organs; the Sexual Organs; the Muscles; the Skin; the Eye; the Ear.

This classification may seem familiar to you, if you studied medicine in Cincinnati, or have been a reader of the JOURNAL. But I assure you Dr. Webster has made an original study under these heads, and whilst he is willing to admit indebtedness to his old preceptors, he claims to be heard for his own work. I cordially recommend this book to my readers as one to be read and studied.—*Eclectic Medical Journal*.

SENT POST-PAID ON RECEIPT OF PRICE BY

JOHN M. SCUDDER'S SONS, Cincinnati, O.

TEXT-BOOKS,

Other than Eclectic, in use by the Students of the Several Eclectic Colleges.

	Binding.	Publishers' List Prices.
Bell's Comparative Anatomy and Physiology,	- Cloth,	\$2.00
Brubaker's Physiology,	- - - - - " "	1.00
Cleveland's Lexicon,	- - - - - " "	75
" " " " " "	Leather,	1.00
Dunglison's Dictionary,	- - - - - Sheep,	8.00
Gould's Dictionary,	- - - - - Cloth,	3.25
" " Indexed,	- - - - - Half Mor.	4.25
Gray's Anatomy, Plain,	- - - - - Cloth,	6.00
" " " " " "	- - - - - Sheep,	7.00
" " Colored Plates,	- - - - - " "	8.00
Huxley's Physiology,	- - - - - Cloth,	1.75
Huxley & Martin's Biology,	- - - - - " "	2.50
Kilgour's Indications,	- - - - - " "	1.00
Kirke's Physiology,	- - - - - " "	4.00
" " " " " "	- - - - - Sheep,	5.00
Klein's Histology,	- - - - - Cloth,	1.75
Lloyd's Elixirs,	- - - - - " "	1.25
Nancrede's Anatomy—C. P.,	- - - - - Oil Cloth,	2.00
Nettleship on the Eye,	- - - - - Cloth,	2.00
Norton's Ophthalmic Therapeutics,	- - - - - " "	2.50
Norton's Ophthalmic Diseases,	- - - - - " "	3.50
Ranney's Nervous Diseases,	- - - - - " "	5.50
Reese's Medical Jurisprudence,	- - - - - " "	3.00
Rohe's Hygiene,	- - - - - " "	2.50
Roosa on Diseases of the Ear,	- - - - - " "	5.50
Hyde's Diseases of the Skin,	- - - - - " "	5.50
Sajous on the Nose and Throat,	- - - - - " "	4.00
Steele's Physics,	- - - - - " "	1.17
Tenney's Natural History,	- - - - - " "	1.38
Thomas' Dictionary,	- - - - - " "	3.00
" " " " " "	- - - - - Sheep,	3.50

SENT, POST-PAID, ON RECEIPT OF PRICE, BY

JOHN M. SCUDDER'S SONS, Cincinnati, O.

NATIONAL LIBRARY OF MEDICINE



NLM 00139709 0